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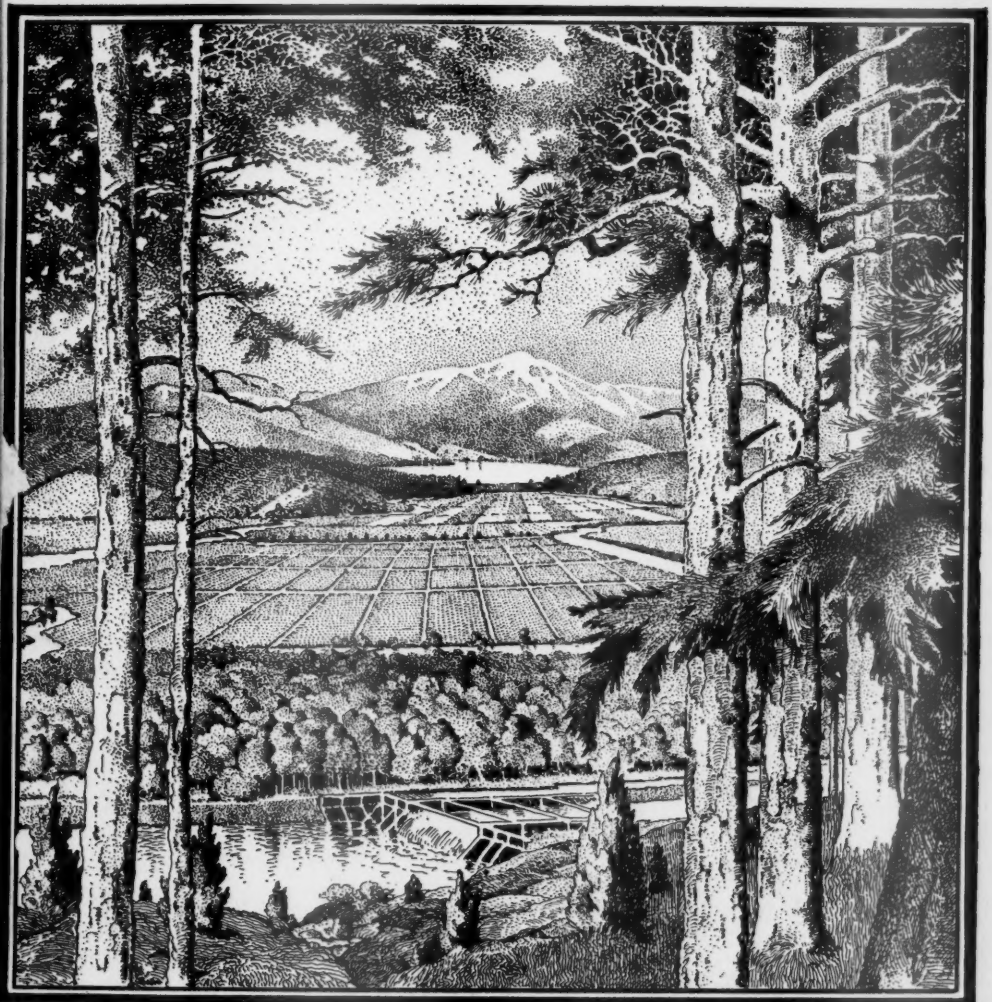
FORESTRY & IRRIGATION



1311 G Street, Northwest, Washington, D. C.

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American Forestry Association

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Sustaining Membership, $25 a year.

FORESTRY AND IRRIGATION is the official organ of the Association, and is sent regularly to all members.

APPLICATION FOR MEMBERSHIP

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To THOMAS E. WILL,
Secretary American Forestry Association
1311 G St., N.W., Washington, D.C.

Dear Sir: I hereby signify my desire to become a member of the American Forestry Association. Two Dollars ($2.00) for annual dues enclosed herewith.

Very truly yours,

Name_____

P. O. Address_____

Forestry and Irrigation

THOMAS ELMER WILL, Editor

CONTENTS FOR FEBRUARY, 1907

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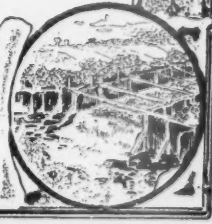
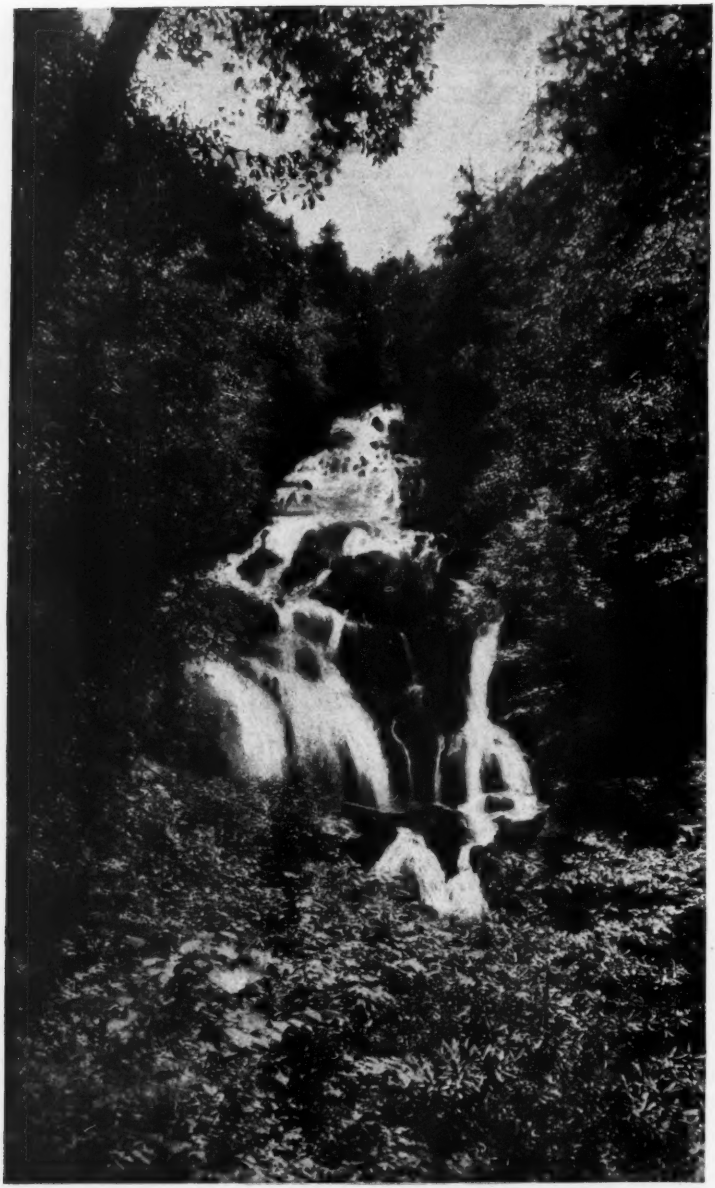




Falls on Upper Catawba River in Great Smoky Mountains, North Carolina

VOL. XIII. FEBRUARY, 1907 NO. 2

EDITORIAL

Strengthen the Association

Experience constantly testifies to the importance of increasing the strength and effectiveness of the American Forestry Association. That our forests cannot be saved without legislation is conceded, and that legislation cannot be had without pressure is daily growing more evident.

In the June issue of this publication lines of activity were suggested whereby the Association may become a more effective force in securing legislation. Hard on the heels of that expression came some strong corroborative testimony as to results accomplished on the same line.

An Object Lesson

Another organization representing general welfare activities has tested the methods there outlined. The organization is much smaller and, financially, much weaker than the American Forestry Association; yet the facts as related indicate that it has attained successes which may well cause this association to look to its laurels.

The president of the association referred to called, recently, at this office and gave some of the officers the benefit of his experience. He states, in effect, that the first article in the creed of the members of his organization is, "I believe in the gospel of work," and the second is like unto it, "I believe that this work should be done largely by myself and by my fellow-members."

The business of the central office of this organization, seems primarily to be to select eligible targets, and then to call upon the entire membership to fire, simultaneously, at them; and so frequently have these calls been made and so thoroughly have the members been trained in the art of firing, accurately and together, that they bring down their game in a manner fearful and wonderful to contemplate.

Unlike the American Forestry Association, the organization in question has no organ. At the opportune moment its officers send to the membership a circular letter, stating the thing to do and the way to do it; the members do the rest.

With this magazine in its possession, the American Forestry Association should occupy a far more advantageous position. The magazine en-

ables the Association to maintain a ceaseless campaign of education. The National office can keep constantly in touch with the membership, explain fully to them the "paramount issues," and indicate the work the membership should do.

Working Together

But suppose the plan of campaign outlined by the office should not be agreeable to the membership. Nothing, in that event, should be simpler than to bring the office and membership into harmony. This Association is a self-governing body. Should it so desire it could easily arrange a system of voting by mail whereby the wishes of the membership on any point could be promptly registered and published. The question could be submitted in one issue of the magazine, and the result, as shown by votes mailed in, declared in another. In this way the office and membership could at all times keep together and co-operate in perfect harmony.

In any event, is it not clear that an organization such as ours should mean far more than a roll of names, however formidable, in a card catalogue, an annual payment of dues, and an annual meeting attended by a small percentage of the membership. It should be an organized, trained, aggressive, working body. The object of its existence should be to get things done, and the chief factor in getting them should be the membership itself.

The Thing To Do

The thing to do now is to show that we want the Appalachian bill passed. The Speaker has said that 80 per cent of the House know nothing about it. If so, it is because their constituents have not required them to know about it. Representatives are not masters; they are servants. What their constituents want they can require at the hands of members. A Representative is elected for but two years. Elections are often close. The Representative who retains his seat is he who keeps his ear to the ground. If his constituents demand tariff revision he becomes interested in tariff revision; if they tell him to "stand pat" he probably becomes a "stand-patter." His views on ship subsidy or credit currency are those that are dinned into his ears, and that stare at him from his daily mail.

Now, if a Representative never hears from his constituents on the subject of the Appalachian-White Mountain bill he naturally concludes that, however important to some the bill may be it is not deemed important in his district; and, hence, it is not important to him. He, therefore, brushes it aside to listen to the man who must have the postoffice on pain of joining the other party faction the next time.

Write Your Member

The moral is, write your member to demand, work for and vote for the passage of the bill. Tell him you want it and why you want it. See your neighbors and get them to do the same. Supply them with arguments; FORESTRY AND IRRIGATION, late issues especially, is full of them. Ask them to "put it strong." Then, when your Representative finds his mail teeming with Appalachian letters, he will recover from that uninformed and indifferent condition in which Speaker Cannon finds him.

Get Members

The next thing to do is to get members for the Association. A word from you to your neighbor may be worth a dozen letters from the National office; besides, a hundred to one the National office has never heard of him and cannot write him a letter. Urge the importance of the forestry movement. Show that nothing can be done without organization. Then see that he applies; or, better, send in his application yourself. Let March be the banner month for growth in membership. Resolve personally to solicit, by word, letter, or both, at least five members. Post this resolution where you will see it daily and then act on it. Fifty-eight hundred persons can, if they will, move mountains. Let the movement begin.

Are We Abandoning Wood as a Material?

Within the past few years the opinion has been commonly heard that we are rapidly getting away from the use of wood, and that before long it will be in very large degree replaced by other materials. Passing through the streets of any of the large cities, we may see that for building purposes wood has yielded to brick, stone, cement, and iron; and going inside the most modern office buildings we note the replacement of wood by metal for doors and finishing purposes. Even filing cabinets and desks are to a considerable extent made of metal. Similarly, we learn that iron is rapidly replacing wood in the manufacture of freight cars, and that it is being used more and more in the construction of passenger coaches. Ships once made entirely of wood are now made mostly of iron and steel; the same is true of bridges, farm implements, and other manufactured articles. Will not the large use of wood eventually cease because of its replacement by other materials?

But to look at the other side of the question: The last few years have developed entirely new uses for wood, some of which require enormous quantities already, and may demand still more in the future. For instance, in the manufacture of pulp, the quantity of wood used increased from 1,986,000 cords in 1900, to 3,192,000 cords in 1905, an increase of over 60 per cent. Were it not for cheap wood as a material, our present large editions of daily papers and monthly magazines could not be produced.

The fact has lately been developed that the rectangular wooden block, all things considered, forms probably the most acceptable street pavement known. At the close of 1905 there was in use in New York, Boston, Baltimore, Indianapolis, Minneapolis, and other cities, about 80 miles of wood pavement. This use is growing apace. Think of the wood required to lay a three-and-a-half-inch pavement over the streets of even a single large city! The amount of wood now required annually for railroad ties, and for telephone, telegraph, and other poles for electric wires and for many other purposes, is now much heavier than ever before. Although we are getting away from the use of wood for some purposes, the demand, on the whole, is greater than ever before. Statistics show that the amount of lumber produced in 1905 was about the same as in 1900. The demand was greater in 1905, and the direct result was a 25 to 50 per cent increase in price for the various grades. We are not getting away from the use of wood. It is the most accessible and serviceable construction material man has ever known, and he cannot get along without it.

AGRICULTURAL SETTLEMENTS IN FOREST RESERVES

WHEN it is remembered that the forest reserves in the United States cover nearly 124,000,000 acres, an area greater than all the New England and Middle States with Maryland and Virginia thrown in, it will be understood why some tracts of agricultural land were necessarily included within their boundaries. The policy of the Government, as clearly expressed by the President, is that all Government land shall be, as far as practicable, put to its best use. For this reason the Forest Service has advocated and helped to bring into effect two methods by which cultivable forest re-

serve land can be used as such.

1. It was arranged that any tillable land might be leased and cultivated at a reasonable rental charge;

2. On June 11, 1906, an act was passed making it possible for the Secretary of Agriculture to list with the Secretary of the Interior any areas within forest reserves chiefly valuable for agriculture; these areas, after formal opening, to be subject to settlement and entered under homestead laws.

About six months before the passage of this act, petitions had been presented to the President and the Secretary of Agriculture asking that certain lands in the Bitter Root Forest Reserve, near Como Lake, Montana, should be restored to the public domain on the ground that they are unusually well adapted for apple-orcharding. Upon examination, it was found that the land asked for is covered with a growth of fine yellow pine, and it was decided in the Forest Service that these valuable timber lands should not be opened up to settlement and entered until after the timber had been sold and lumbered in such a way as to insure reforestation; the result being that, if the area should not be taken for agriculture, it would be left in a condition capable of producing a new forest. The reasons for this decision are as follows:

1. There is no shadow of doubt that timbered land in this region is valuable for forest purposes;

2. There may, however, be some doubt whether, except to sell the timber from such area, the homesteader would be willing to clear heavily wooded land for cultivation;

3. Experience has shown that there is no legal safeguard against fraudulent entry when made for the sole purpose of selling the timber and leaving the denuded land to its fate;

4. To cut the mature timber from land does not lessen its value for agriculture alone; but would discourage any, except a *bona fide* settler, from taking the cut over area, from which, except for a small amount of poles, ties, firewood, and small lumber, he could hope—after a considerable outlay for clearing expense—to get no return except by farming.

5. If, after such a timber sale and an opportunity to take the land as agricultural, no settlers should come forward, it would be possible, by a new proclamation, to restore the area to the forest reserve in as good a condition for forest purposes as though it had never been opened for settlement.

Those who asked for the land in question were very much dissatisfied with this decision, arguing that the value of the standing timber should be given to the agricultural settler as a bonus to induce him to make a home in the wilderness. This argument might have had weight had there been any guarantee that the person obtaining possession of the timber would continue as a home maker after selling it. The chance of this seemed so remote, however, that the petitions were refused and the land retained in the forest reserve.

When, on June 11, the Agricultural Settlement Bill passed, the Forester received, as he expected, a large number of applications to have definite tracts of the land mentioned above listed and opened for entry. Because of the criticisms which the refusal to exclude this land from the forest reserve had aroused, and because there might be a feeling that examinations under the act were not conducted with a *bona fide* desire to find and open the land actually agricultural, the Forester sent one of his inspectors, most experienced in the theory and practice of agriculture, to make a full examination. This inspector spent two months in the district, and the result of his investigation shows conclusively how dangerous it would be to listen to requests for forest reserve land covered with timber. There were fifty-nine applications, and but three of these were so situated that the land should be opened for entry, and these were not

in the immediate vicinity of Lake Como.

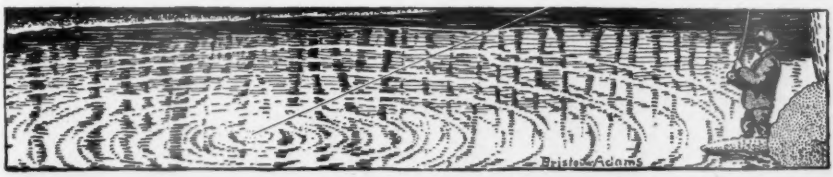
When it is remembered that the petitioners for exclusion from the forest reserve mentioned above claimed that the land would be valuable for apple-orcharding, it is clear from the following facts that their need for extra area was not pressing.

The inspector found that the bench land to the east of the forest reservation, more advantageously situated because lower and more level, was left out of the reserve to meet a similar clamor, raised some years ago, at the time the reserve was created. Most of this land has been taken up under various laws and has been denuded of trees with great money profit to the grantees from the Government. Yet thirteen acres of it now lie barren and waste for every acre that has been cultivated as farm land. At present stumpage prices for timber the United States has given away in this region $840 worth of timber for every acre of stumpland reclaimed. It would have been much cheaper to clear, improve, and irrigate the land and give it, with the improvements, outright to the settler.

The real home maker has seldom profited by the policy of the Government in alienating its western timber land. Adventurers have "proven up" and sold either the land, the timber, or both to large corporations for a few dollars per quarter section. The effect of the United States timber laws has often been to give speculators an easy means of securing title to valuable timber land, while the real home maker is compelled to buy timber for domestic uses from these fortunate beneficiaries.

The policy of the Government is to help the home maker without encouraging the speculator or grafter. To do this the homestead laws must be rigidly enforced. The Forest Service has no desire to withhold from settlement any land, within forest reserves, more valuable for farms than for forestry, but it will not open up heavy timber on the remote chance of its being cleared for a home. To protect these trees under a sensible forest policy will surely prove the "best use" of the land where they grow.

It is interesting to note, however, that since June 11 the Forester has received nearly 2,600 applications for homesteads in the forest reserves, the majority of which are for land in river and creek bottoms not covered with a valuable growth of timber. Several officers of the Forest Service are busily examining the land applied for; and, in most instances where the land is not heavily timbered, the applications are being approved, and the applicant, by improving and making homes on the land, can get full title to it without other cost. It is hoped and believed by the Forester that the *bona fide* home makers who settled upon these various tracts of land will realize that their future prosperity depends on the forest reserves. With the great lumbering projects sure to be carried on in forest reserves, during an indefinitely long future period, they will be able to find a market for their produce, and employment, at good wages, for their spare time. For these reasons, if for no other, it is hoped they will not only refrain from doing damage themselves, but will prove a supplementary force to guard against fire and other depredations.



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NEWS AND NOTES

Friends of Forest Organize

The American Lumberman announces that, through the efforts of a number of public-spirited citizens who believe in the protection and perpetuation of Oregon's forest wealth, there has been organized in that State the Oregon Forest Protective Association. The object of this organization is to do whatever may be possible along reasonable lines and with due regard for the commercial claims upon Oregon's timber to conserve the forest resources of this State. Although realizing that procrastination in the matter of legislation has lost to the State hundreds of thousands of acres of valuable timber land now in the hands of speculators and syndicates, the promoters of the organization believe that much can still be done to protect and preserve the forest interests of the greatest timber State in the Union.

Index to Vol. XII

The index of Volume XII of FORESTRY AND IRRIGATION is now ready for distribution. It will be mailed gratis to any member of the Association, or to any subscriber on application.

Women's Clubs for Forestry

One of the most hopeful voluntary agencies for creation of forestry sentiment, and the conversion of this sentiment into action, is the General Federation of Women's Clubs. This great and progressive organization has, for some years, maintained a Forestry Committee which pushes the work of forestry agitation and education among the membership, and directs campaigns for needed legislative or other action. The present chairman of this committee is Mrs. P. S. Peterson (corner Lincoln and Peterson avenues, Chicago). She appreciates the difference between the type of "effort which has been called forestry," and the real forestry movement, and is doing her best to bring the Women's Clubs into step with the latter. She has recently mailed to each member of her committee a letter and a list of questions on forestry. The effect of such work should be both to increase interest in the general movement and to bring together a body of data of great value in promoting the work. The letter and questions follow:

DEAR MADAM:

I am sending with this a list of questions which will help me to know what is being done along forestry lines in your State. Please answer the last question as fully as possible.

In regard to the Appalachian and White Mountain Reserve bill, of which I wrote you in November, I desire to thank you for anything you may have done in reference to it and request that it be mentioned at every forestry meeting until March 4th, when this session of Congress will close. The preservation of the forests, the streams and the agricultural interests can be successfully accomplished only by the purchase and creation of forest reserves.

This bill passed the Senate without dissent and the majority of the members of the House are said to favor it. Whether it becomes a law or not depends simply upon its coming to a vote in the House. The decision of this vital question lies with the Speaker.

Will you kindly answer the following questions in spaces indicated, as fully as you are able, and return the same to me at your earliest convenience. I shall be pleased to explain further any questions which are not understood.

1. How many clubs in your State co-operate with you?

2. Are there other associations doing work germane to forestry? Name them.

3. Have you tree and forestry laws in your State, and laws relating to forest fires? Have you studied them?

4. Have you a State Forester or a Forestry Commission?

5. Does any institution of higher learning in your State provide for education in forestry? How many, where located?

6. Is there an experimental school or station doing forestry work?

7. Is any movement on foot to secure forest reservations in your State? Have you any? How many acres?

8. How many acres of forest are being managed under the supervision of the Forest Service?

9. What proportion of your State was formerly forested? How much now?

10. Is an Arbor Day manual published in your State? By whom?

11. Does the Educational Department issue publications on tree and bird lore?

12. Is anything being done in your State for the preservation of birds?

13. Are you trying to save historic trees and those which have been ancient landmarks?

14. Have you any plans for the study of forestry in the clubs, or for advancing the work in your own State?

15. What are the special needs in your State?

16. What have the Women's Clubs in your State done for forestry?

Civil Service Examinations The United States Department of Agriculture announces civil service examinations to occur March 6, 1907, for three positions: First, that of irrigation farmer, salary $720 to $1,200 per annum; second, that of irrigation manager, salary $1,800 to $2,500 per annum; and, third, that of supervising drainage engineer, salary $2,000 to $2,500 per annum. Applicants should at once apply either to the United States Civil Service Commission, Washington, D. C., or to the secretary of the nearest Board of Examiners.

Personals Prof. George L. Clothier, of the Mississippi Agricultural College, is as busy as ever. In a personal letter he writes:

"My work here is piling up till I can hardly see over it. I have plans to lay for my experiments here at the college for another year. I have to plant 40 to 50 bushels of hickory nuts if I can get them, transplant about 50,000 forest trees, get my nursery ready for next spring's planting, order pecan trees for planting in December, and get seed corn from farmers over the state to start my breeding experiments, besides teaching three hours per day."

An event of interest to foresters is the marriage of Mr. Charles A. Scott to Miss Perley Burnham Jewett, which took place on January 30 at the home of the bride's parents in Broken Bow, Nebr. Mr. and Mrs. Scott will visit Washington and other points on their wedding tour, and will be at home after May 15 at Halsey, Nebr., Mr. Scott's headquarters as supervisor of the Dismal River, Niobrara and North Platte National forests.

England The action of the British government with regard to the extension of forestry education in England includes a recommendation that the Alice Holt Woods in Hampshire, where considerable experimental planting has already been done, be made a demonstration area for England.

Armstrong College, Newcastle-on-Tyne, has recently augmented its forestry course and has taken over the local management of Chopwell Woods in the county of Durham, a tract of about 900 acres, for demonstrating the various operations relating to practical forestry.

A new edition of Dr. Schlich's *Manual of Forestry* has recently appeared, which contains as an appendix to Part III "Forestry in the United States of America."

Scotland Volume XX, Part 1, of the *Transactions of the Royal Scottish Arboricultural Society* contains a large number of papers of great interest on the varied operations of practical, applied

forestry. Among the articles especially worthy of mention are "Development of a Larch Crop," "Forest Policy in the British Empire," "Creosoting of Home-Grown Timber," and "Creosoting of Timber by Absorption." John Nisbet contributes an article entitled "Notes on Continental Forestry in 1906," especially concerning the work done in France and in Germany. (See also *Recent Publications.*)

Japan

Some interesting abstracts from the Japanese forest laws and ordinances are noted in the October number of the *Indian Forester.*

India

On information supplied by the Imperial Superintendent, Forest Working Plans, Dehra Dun, United Provinces, the *Indian Forester* for November reports that the forests of India under working plans prescribing improvement fellings comprise 49 tracts of various sizes, aggregating a total of 6,892,405 acres.

The government of India has decided to raise the status of the existing Imperial Forest School at Dehra Dun. The school will hereafter be known as the Imperial Forest Research Institute and College, and the staff will include six officers of the Imperial Service.

Hawaii

At the regular quarterly meeting of the Farmers' Institute of Hawaii a very interesting paper on the "Fruits of the Hawaiian Islands" was presented by Dr. Wm. T. Brigham.

The Division of Forestry of the Board of Agriculture and Forestry of Hawaii has recently issued a four-page leaflet by Mr. David Haughs, Forest Nurseryman, Hawaii, entitled "Instructions for Propagating and Planting Forest Trees."

Forest Interest in California

On Tuesday, January 8, when the American Forestry Association was meeting in Washington, there was a meeting of another and no less enthusiastic forestry association on the other side of the continent. The Tri-Counties Reforestation Committee met at Redlands, Cal., and completed a permanent organization. There was a good representation of delegates from the three counties interested, San Bernardino, Riverside and Orange. The organization is for the carrying on of the work of reforestation in the San Bernardino Forest Reserve, the objects being more fully set forth in the following from the articles of organization:

"The general committee shall have general supervision and direction of all work for the better protection of the timber now standing in the San Bernardino Forest Reserve, the acquiring by the Government of all private holdings within the said reserve, and the afforesting of all denuded areas, and the afforesting of all areas not now covered with sufficient timber to conserve to the best advantage the precipitation on the said reserve."

The committee discussed and approved the bill which is to be introduced in the California Legislature to permit private holders of lands in the reserve to exchange their holdings for other Government lands outside the reserve. The State has an area of 6,000 acres in the reserve and proposes to do this with its lands, thus throwing this acreage back to the reserve.

The committee also approved the bill of Congressman Smith, which places the killing of game in forest reserves in the hands of the Secretary of Agriculture, under such regulations as he may see fit to prescribe. This is the same bill that had been rejected by the Redlands Board of Trade.

The committee organized by electing officers:

President, Francis Cuttle, of Riverside; Secretary, Col. W. L. Vestal, of San Bernardino; Treasurer, E. D. Roberts, of San Bernardino; Vice-Presidents, Mr. Frazer, of Riverside; H. H. Garstin, of San Bernardino; E. E. Keech, of Orange.

Meetings will be held quarterly; the next, at Riverside, in April.

A UNANIMOUS PRESS

HAS the Appalachian bill an enemy? If so, who and where is he?

Not often in the history of legislation does a measure of such conspicuous importance make so many friends and so few foes. Insurance investigation and reorganization, railway rate regulation, meat inspection, denatured alcohol, all had their enthusiastic friends, but, also, their bitter foes. Let tariff or currency or expansion or ship subsidy come up in the National Legislature, and men in Congress and out, with voice and pen, will shiver lances in fearsome combat.

How different with the Appalachian bill! As is well known, this measure unanimously passed the Senate, and was reported from the House Committee on Agriculture without dissent. With equal unanimity the press adds its mighty voice in advocacy. Many ringing editorials have reached this office. If, in the entire United States, one has opposed the measure, its protest has not been carried to Washington.

Following are extracts from some of the many editorial expressions which have recently appeared on this subject:

[New York Times, Nov. 14, 1906.]

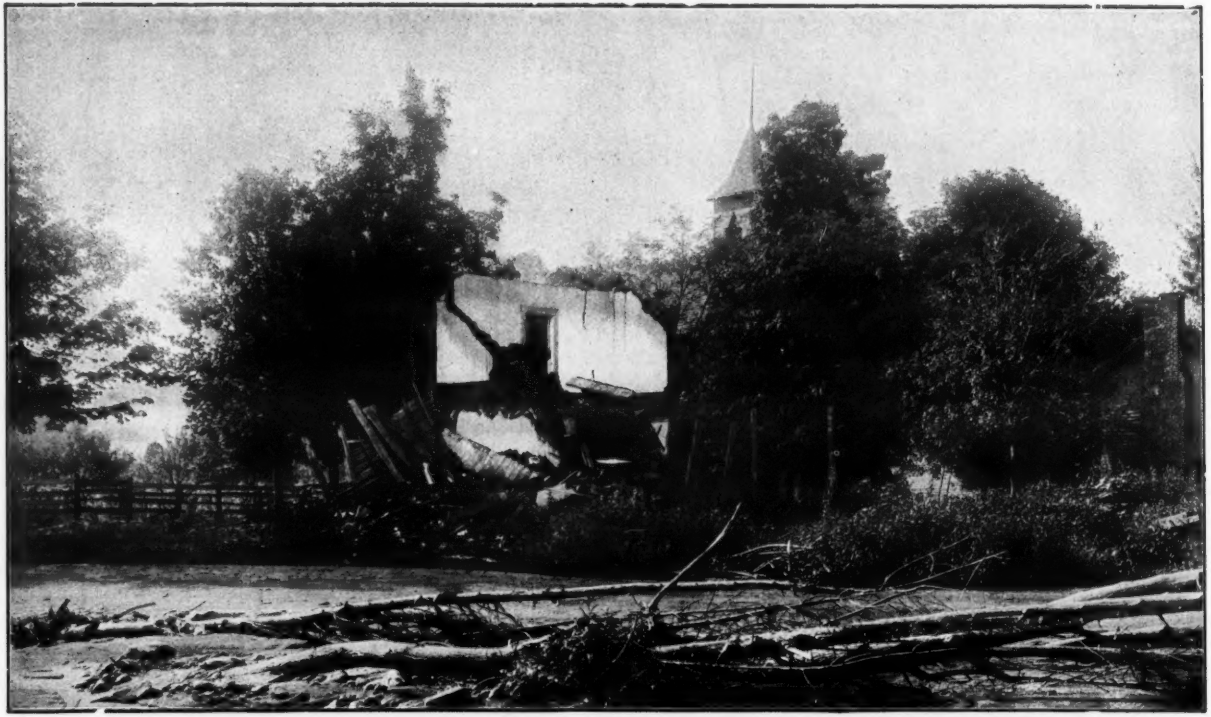
French Forests a Warning

The forested mountains of France were in the way of complete denudation before 1860. Their mighty sponges of roots, deciduous deposits, and undergrowth which regulated the flow of the French rivers at their springs were exposed, dried, and, taking fire, were destroyed. Heavy downpours washed away the disintegrated mountain soils, which filled the river beds and checked navigation. Productive land became barren. There was a dearth of lumber. The cities with their large manufacturing interests were punished with torrential floods and droughts, and the punishment increased recurrently.

The French government at last seriously bestirred itself. It appropriated $15,000,000 to purchase 400,000 acres of the deforested area; it has incurred for over forty years an annual expenditure of $600,000 for reforestation, and it must yet acquire an additional tract at a cost of $20,000,000. The state-owned forest of France will remain for many years non-productive.

Our Government will profit, though tardily, by the experience of France. The great Eastern forest brows of the White Mountains and of the Southern Appalachian chain are a public sacrifice to the ephemeral needs of their private owners; in the latter division 30 per cent of first-growth trees have been cut, and 70 per cent in New Hampshire. Already gales of fire sweep the open spaces of the cut-over districts. Floods pour uncontrollably down the barren declivities into the manufacturing towns, bearing with them bridges, dams, and mills, destroying public roads and fertile bottom lands, and filling navigable streams with silt. The flood damage in the Southern Appalachian region amounted in a single year to $18,000,000; $7,000,000 is its average annual loss. In New England the famous water-power streams are each dry season running lower, and in the flood season becoming dangerously unmanageable.

The bill setting aside the two National Eastern reserves would introduce practical forestry protection in the New England watersheds—800,000 acres—from which flow its five principal rivers, namely, the Connecti-



View showing effect of floods along Nolichucky River

cut, the Merrimac, the Androscoggin, the Saco, and the Piscataqua, with their important tributaries and enormous water powers; and in the Appalachian Mountains, 4,000,000 acres, situated at the headwaters of the James, the Roanoke, the Yadkin, the Catawba, the two Broads, the Saluda, and the Chattooga, the Coosa and Chattahoochee, and the Kanawha and the Tennessee—this watershed receiving the heaviest rainfall east of the Sierras.

The bill asks a beggarly appropriation of $3,000,000. The forests it would protect are still productive. They will pay the expense of maintenance, and in a few years yield a profit. The bill has passed the Senate. Shall the last session of the Fifty-ninth Congress see it rejected?

[Boston Evening Transcript, Dec. 6, 1906.]

Critical Stage in White Mountain Forest Campaign

The country now possesses, in round numbers, one hundred National forest reserves comprising 100,000,000 acres. In addition to these there are two reserves in Alaska and one in Porto Rico, not to mention ten National parks of great size. All these are located west of the Mississippi River, beginning with the lately established reserve at the headwaters of that stream. About 95 per cent of the population of the country is located east of the present reserve area. As Mr. Gifford Pinchot, the National Forester, has pointed out, the headwaters of every stream of interstate importance in the country is now protected by a National forest reserve, except those streams which rise in the Southern Appalachian Mountains and in the White Mountains.

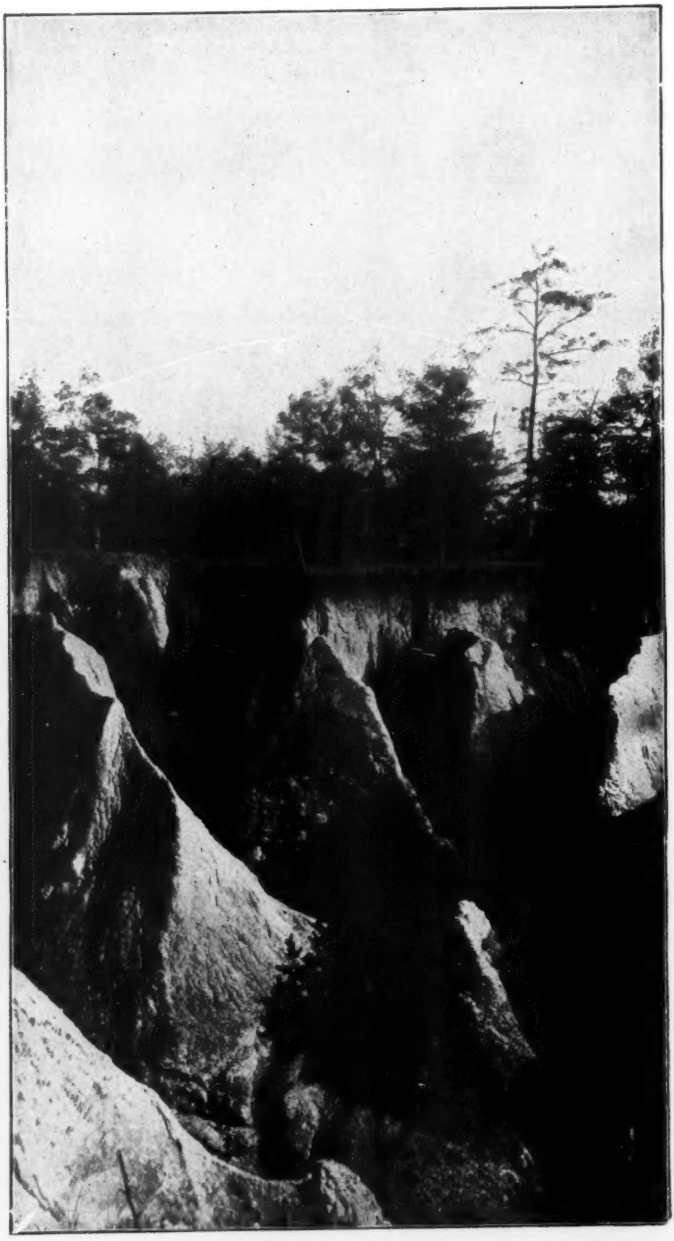
It is a mistake to suppose that New England's interest in this policy is confined to the White Mountain reserves, great as it is in them. Boston money and New England wealth in general have been of late extensively invested in Southern and Western water-power plants for the production of electricity, for sale and distribution to adjoining communities. It is not only that the Southern cotton mill interest depends in some part on cheap power to hold the great Oriental trade in cotton cloth; but the Northern capital now invested in the South in the production of electric power derived from mountain streams which will have for Southern mills an estimated value of $45,000,000 per year—this great investment of late years can depend for its returns only upon the preservation of the water-powers. If the trees are swept away the soil will not be long in following in great mountain rains and freshets; with the soil gone, the "sponge" which stores up the rains and feeds the rivulets and rivers must go next. What has made the "sponge," and what protects it still, is the forest —the crop of centuries' growth upon these mountain sides. If that crop is all to be harvested at once instead of used as gradually as it has grown and will continue to grow, what becomes of the basis of our electric power stocks and bonds due forty years hence?

Seldom has a great National project been supported by stronger arguments, including the most severely practical as well as the æsthetic. Nature lovers and mill engineers combine in asking for the preservation of our mountain forests. Every Congressman should hear from a hundred constituents.

[The Troy Times, Dec. 29, 1906.]

Demand from New England

An appeal made to the members of the National House of Representatives from the New England States is one not likely to be ignored by those to whom it is addressed. The communication, signed by the Governors of all of the States mentioned and by many prominent residents of New England,



Water washed gulley, McDowell County, N C

refers to a bill pending in the House and providing for the establishment of two forest reserves in the East, to be known as the Appalachian and the White Mountain Forest Reserves. This bill has passed the Senate, and the object of the petition is to arouse sentiment in the popular branch of Congress to the importance of the matter and the necessity of the measure becoming a law. The appeal is backed by a strong array of facts and arguments, all going to prove the wisdom and value of maintaining such reserves as are proposed, pointing out that the West is well supplied in this respect, and dwelling on the special claims the localities in question have to consideration. President Roosevelt has repeatedly indicated his warm approval of the policy of forest preservation, and should the bill pass may be counted on to enforce strictly its provisions in the public interest. There is reason to hope that when Congress shall reassemble the matter may get the favorable consideration desired.

[Chicago Evening Post, Jan. 3, 1907.]

Urge the Bill's Passage

The White Mountains constitute the watershed of New England. The loss of the forests means the loss of manufacturing industries. The rainfall is distributed so quickly when the forests are gone that there is too much water at one season and not enough at another season. The establishing of Government reservations means the safeguarding of the industries of the six New England States.

The southern Appalachian range receives the heaviest rainfall of any part of the United States save the region adjacent to the northern Pacific Ocean. This section of the Appalachian Mountains holds the country's last remaining important stand of hard woods. Deforestation is going on rapidly in the region. Already complaint of floods and consequent damage to mill property and to milling operations has come from the industrial centers in the valley. The loss of the forests is followed by the loss of the soil, which the floods wash down to the filling of

Wreck of a Mill, Hampton, Tennessee

navigable rivers and harbors. The loss of the mountain forests means future great expenditures for the Government if it would keep its navigable channels clear. Other governments already have learned the lesson of their early folly in felling the forests.

There are 112 forest reserves in the West; there is not one forest reserve in the East. The bill before Congress should pass. There is only one way to get it passed. If the people will take a little trouble in the matter and will write one-tenth of the number of letters that were sent to the members of the lower House on the subject of the army canteen the Representatives will put through the forest reservation bill in less time than it takes to fell a sapling.

[New York Press, Jan. 4, 1907.]

Eastern Forest Reserves

This newspaper desires to record its emphatic approval of the pending bill in Congress to establish National forest reserves in the southern Appalachian and White Mountains.

A brief study of the literature of this important and interesting subject immediately makes a friend of the cause. The more it is examined the stronger appear the reasons in its favor. President McKinley was a friend of the project. After an exhaustive investigation Secretary Wilson of the Department of Agriculture gave a convincing argument for its adoption. It has now enlisted the aggressive interest and indorsement of President Roosevelt. * * *

We may add to this these considerations, some of which are suggested by the American Forestry Association:

The southwest Appalachians contain the last remaining important stand of hardwoods.

As National parks the two regions are of unparalleled beauty and accessibility. The scenery is magnificent.

Agriculture, water power and navigation are involved by the project under consideration, and will be favorably affected if it is adopted.

Waterfalls in these mountains are capable of producing electric power of great value. These manufacturing possibilities will be gone when the fast-going forests disappear. Water powers are already dwindling.

Fires and other foes of the forests would be fought successfully if the Government assumed control.

It is a wise public policy to establish forest reserves.

The West has 112 forest reserves, with an area of 125,000,000 acres; the East has none.

The bill to establish the Southern Appalachian and White Mountain forest reserves has been unanimously passed by the Senate. It is now unanimously recommended for passage by the House Committee on Agriculture. It should come to a vote.

[The Minneapolis Journal, Jan. 4, 1907.]

Forest Reserves and Legislative Favoritism

The American Forestry Association, of which the Secretary of Agriculture is President, is appealing to all friends of the forests for their assistance in behalf of the bill to establish National forest reserves in the Southern Appalachian range and in the White Mountains. This measure passed the Senate and has been unanimously recommended for passage by the House Committee on Agriculture. The President is said to be strongly in favor of it, as would naturally be expected, and a majority of the members of the House are counted on the same side, and yet there are grave apprehensions lest the matter can never be brought to a vote.

If a majority of the house favor it, it is difficult to understand why the machinery of that body should be so poor-

ly adapted to what is required of it as to make it impracticable for it to bring up this measure and dispose of it in a few minutes. If the arbitrary domination of the House by the Rules Committee is good for anything, it ought to meet just such a case as this. When we hear about matters of vital interest to the country being delayed or defeated entirely because of the difficulty of bringing them to a vote and then observe with what promptness and celerity matters of party concern or specially favored by the controlling committee are brought up and disposed of, the public is inclined to lose patience with that kind of House organization which is efficient and sufficient for measures favored by the Rules Committee and for nothing else. The law's delays of which so much complaint is made, are nothing compared with the delays in simple matters of legislation, when it doesn't suit the whim of the powers that be to dispose of them promptly.

[Montgomery Advertiser, Jan. 5, 1907.]

The Forest Reserves

One of the most important and far-reaching measures now before Congress is in imminent danger of defeat unless its friends can find a remedy for the conditions now existing. We allude to the bill to establish and maintain what are known as the White Mountain Forest Reservation and the Appalachian Forest Reservation. The former lies principally in the State of New Hampshire, but the latter embraces portions of Maryland, West Virginia, Virginia, North and South Carolina, Georgia, Alabama and Tennessee; in short, it affects all the South Atlantic States, and is of vital importance to the future of all of them.

* * *

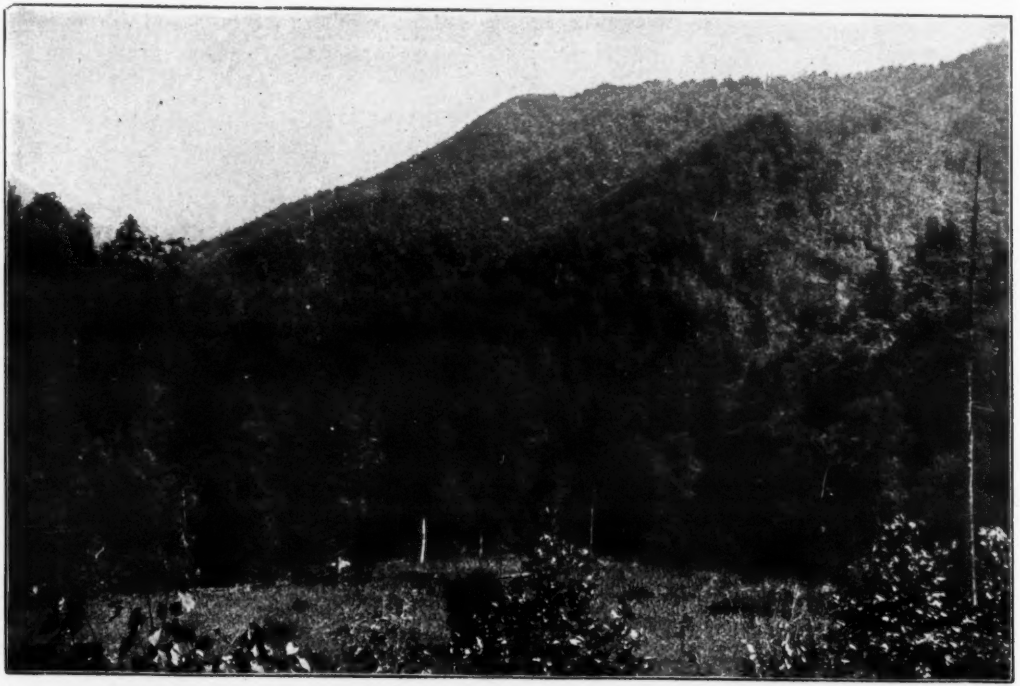
We know that, to use the language of *The Columbia State*, "It has been urged as an argument against the measure that it is not compatible with the idea of States' rights to give the National Government any additional control of lands." But this is a matter beyond the control of any one or any two or three States. They must unite, and the only sound method of taking united action is through the National Government. The Appalachian region lies within the borders of eight States. No one State can accomplish much in the way of preserving these vast forests, nor could it do much good in the way of checking the present devastation of valleys and lowlands by torrential floods, which may be forming in areas that are being denuded and over which the State may have no control. It is in its nature a matter for the General Government. Most of the States interested have already consented to National control.

We understand this argument very well, but if we understand the bill now before Congress, it will safeguard and protect the rights of the States and the people where they cannot protect themselves. The Tennessee River, to take it as an example, runs entirely across the State of Alabama, but has its rise in the Appalachian region of Tennessee, which forms part of the proposed reservation. If the sources of that river are interfered with in such way as to seriously injure Alabama the latter will have no redress. So it is with the entire region affected by this bill. Eight States are partially embraced in it and all their interests are involved. In short, the Government by this measure proposes to protect the States and the people just as it would protect them against a foreign enemy. We do not see that the theory of States' rights is intruded on.

[Springfield Republican, Jan. 7, 1907.]

To Protect Mountain Forest Reserves

There is a vital local interest in the bill now before Congress for establishing two forest reserves in the East, one in the White Mountains and the other in the southern Appalachians. An appeal to New England Congress-



Typical Forest-covered Mountain-side

men to support it bears the signatures of Theophilus Parsons, treasurer of the Lyman mills at Holyoke; E. Lovering, agent of these mills; Reuben C. Winchester, treasurer of the Holyoke Water-Power Company, and William Whiting, of the Whiting Paper Company, as well as those of manufacturers in other parts of New England, who know what headwater forests means for the preservation and equalization of water supply, and who dread the effects of a denudation which will dry up their springs at their sources. * * *

New England is full of small water-powers, available either for local manufactures or for electric transmission of power. Each one of them is a separate argument for the forests. All this means nothing to an individual money-getter whose sole wish is to exploit a wooded tract. Forestry does not appeal to individuals; it is too remote. There is no inducement to plant forests to be cut in 60, 80 or 100 years. A nation can afford to wait; every acre of land planted with timber is an asset; with proper cutting out and policing against thieves and fire it is a safe investment that grows in value every day. There are great areas fit for little else, where the forces of nature might be building up a vast National wealth.

Here is a beginning. In those two reserves are important remnants of the fast disappearing forests that once covered eastern America. In the southern Appalachians is the last important stand of hard woods. Both are invaluable as protections for the water supply. Both are natural beauty spots, and fitted to be public parks for the Nation. All arguments, the economic welfare of the country, the protection of unspoiled wilderness parks, the local benefits which flow from the visitors attached by natural beauties, are on the side of this bill. It is in the public interest; there is no opposition except on selfish grounds. New England should speak in this matter with no uncertain voice, and demand that a measure of such vital concern be not shuffled out of sight on any pretext whatever.

[Providence Journal, Jan. 8, 1907.]

The Demand for Forest Reserves

The value of these proposed reservations has been demonstrated again and again. It is not a mere matter of æsthetics, to justify the scorn of the sordid persons to whom everything is expressed in terms of dollars and cents. At one of the hearings before the House Committee a petition was submitted from New England manufacturers representing interests of over a hundred and thirty million dollars urging the preservation of the White Mountain forests for the sake of the water-power which depends upon them. It will be a serious problem for all this section of the country if this water-power is materially diminished. In North Carolina, West Virginia, Alabama and others of the Southern States similar conditions exist. The few millions which the Government is asked to spend are nothing in comparison with the loss which, unless something is speedily done, will fall upon large classes of people. This point has been made repeatedly, and it has never been disputed. It would be difficult to conceive of anything more unreasonable than the opposition to the forest reserve.

Nor is the question one of water-power alone. The rapid destruction of the forests will have direful results in many directions. The worst of it is that such destruction is entirely unnecessary even for commercial purposes. It arises from the wasteful and unscientific methods of cutting in vogue in this country. Scientific forestry has demonstrated by actual proof that forest property can be made a paying investment without any diminution of the source of supply. At one of the hearings Dr. Edward Everett

Hale, who has long had a special interest in the White Mountains, showed that one-tenth of the revenue of the Kingdom of Bavaria, or some seven million dollars, is derived from the forests, which are now owned by the nation and cut scientifically. The private owner will not be so careful; he is looking for immediate profit, and he cares nothing for the generations to come. With the great mountain ranges secure from the spoiler, much would be done to ensure the perpetual protection of those acres and acres of forest at present being turned into a desolate wilderness.

Those æsthetic considerations which presumably would not move the Speaker nevertheless have great weight. The beautiful scenes of nature in our mountain regions mean much to millions of people. These people have a right to ask that such scenes shall not be mutilated at the behest of private greed. The nation that permits such things stamps itself as a barbarian nation. Is the United States to be forced to endure this reproach because of one obstinate man in the Speaker's chair and a few hundred indifferent or timid men on the floor of the House? The bill which is now slumbering should be taken up and passed, Speaker or no Speaker.

[Boston Evening Transcript, Jan. 12, 1907.]

Forestry Needs National Supervision

Why should discrimination be practised against the East? It has been established as one of the most important features of National policy, that vast reserves of forest should be created in the far West. That is a

Wreck of Bridge on the Southern Railway over the Catawba River. Part standing was saved by running loaded cars upon it.

wise policy and one that has been extended under every Administration for the last twenty years or more. But why should we be denied its benefits in this section? The conditions here are even more urgent than in the West because we are nearer the point of exhaustion. In another aspect this indifference or hostility is inconsistent with Government policy. There is an unusual awakening with reference to our rivers, canals, lakes and waterways of all kinds, but the points for such development to begin are in the forests that conserve the headwaters of our principal rivers and their tributaries. The White Mountains, the Adirondacks, of which New York is measurably taking care, and the Appalachians are all matters of National as well as local concern, as is likely to be discovered when too late.

[Boston Herald, Jan. 17, 1907.]

Eastern Forest Reservations

The Eastern States have supported by their votes in Congress the enormous and expensive forest reserve and irrigation projects, that are of great value to the West, because they are also of unquestionable National usefulness. But they are no more certainly valuable than these two Eastern preserves will be, and they are not so immediately urgent. The prosperity of the part of the country east of the Alleghanies, and including the eastern Gulf States, is entitled to equitable and reasonable consideration in the preservation of its mountain forests and the valuable water-power and navigation advantages dependent on their perpetual safety from the ravages of the unrestrained lumber interests. Regarding the woful plight of some European countries—France and Spain, for example—whose great rivers are choked with the sands washed from their denuded mountain ranges, it seems sheer folly to invite similar conditions for our own great rivers.

The Representatives of the West in Congress, moved by simple gratitude and fairness, should come to the support of the Eastern States, which are threatened with vast loss of resources if this measure, beneficent in so many ways, climatic, sanitary, commercial, economic—to say nothing of the scenic grandeur of the forested hills—shall fail after having been advanced to its present favorable position. * * *

No one man, no three men, ought to be able by short-sighted, obstinate neglect at a critical time to accomplish an enduring wrong to the great group of Eastern and Southern States and their future populations, a wrong which, by injuring their prosperity, will injure the prosperity of the Nation.

[New Haven (Ct.) Register, Jan. 15, 1907.]

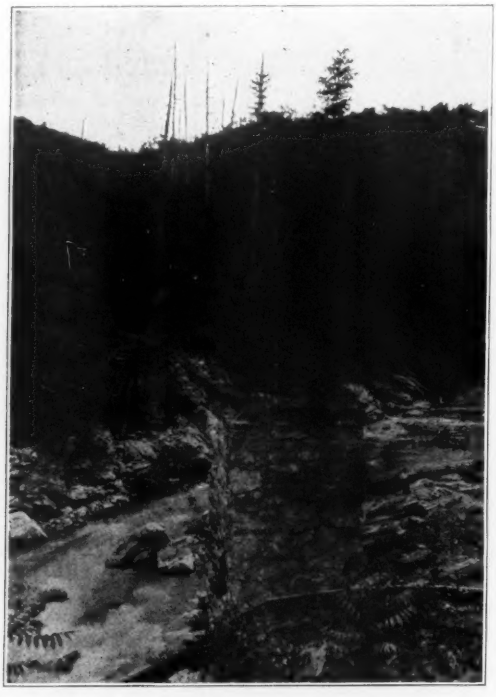
A Most Important Measure

The bill to make National forest reserves in the Southern Appalachian and White Mountain regions now depends for its life upon the will of Speaker Cannon.

The Washington *Times* makes this clear statement of the situation, which only the more adds to the confused understanding of Speaker Cannon's attitude: "Leaders of forestry have brought to bear countless facts and clearest principles. The Secretary of Agriculture has personally examined the region and emphatically recommended his favorable findings to the President. The President himself has repeatedly urged upon Congress the great need of prompt action. Yet the bill, though passed by the Senate, still remains in the House, where it was unanimously reported for passage in the last long session. Have the work and the wisdom of these men been given in vain to this measure? The

American Forestry Association has been tireless in bringing before the people of the affected States what has been done in their behalf, and what they now can do in their own behalf. There is no want of information, no want of conclusive proof regarding the good which the measure would secure, or the evil which must follow its defeat."

The forestry experts complain, and with justice, that the various States interested, including, of course, the State of Connecticut, have been lax in their understanding of the mischief involved if these forests are further denuded. There is no misunderstanding on the part of the Connecticut River of what will happen to it if this demolition of the forests is not stopped by Congress, but unfortunately the Connecticut cannot leave its bed and walk to Washington, nor could it say a word if it got there. This is not the case with the Connecticut General Assembly, which can promptly put itself on record as in favor of the Federal Government purchasing these regions for National preserves. The Connecticut delegation in the House of Representatives can make its influence felt with Mr. Cannon. These things should at least be done to advance a work of the greatest importance to us.



Wreck of a Railroad Bridge, Doe River, Tenn.

[Washington Times, Feb. 2, 1907.]

Up to the States

Words of wisdom went, it is hoped, to the wise when Secretary Wilson said recently:

"I wish the States of the Union would give a little more attention to what concerns themselves, and not look

so much to the Federal Government to have everything done that is done along lines of this kind. * * * You are not likely to get an appropriation for the White Mountains—or for the Appalachian range either—unless the States most interested work harder."

Important as those two projects are—the preservation of New Hampshire's great forest range, and the protection of the rivers which flow from the Alleghany watershed—they will fail unless the people affected make their Representatives in Congress see that they mean business.

ECONOMY IN RAILROAD USES OF WOOD*

BY

WM. L. HALL

Assistant Forester, Forest Service

RAILROADS require for their use the highest quality of timber. In the specifications of the American Railway Engineering and Maintenance of Way Association the following requirements are stated for longleaf pine piles:

"Piles shall be cut from sound, live trees, close grained and free from wind and heart shakes, large or unsound knots, decay or other defects that will impair the strength or durability of the pile. No doubtful grades will be accepted. Piles shall be hewed square, except that one-inch wane will be allowed on two corners half the length of the pile. They shall not be less than 12 inches nor more than 14 inches at the large end and not less than 8 inches square at the small end. Piles having a bend not exceeding 4 inches in 20 feet, 6 inches in 30 feet, and 8 inches in 40 feet or over will be considered straight. No short crooks allowed. Piles must be hewed smoothly without deep score hacks. Piles shall show at least 75 per cent heart on face anywhere in their length."

A longleaf pine tree with an 18-inch diameter, 4½ feet above ground, which would be about the right size to furnish the required pile, is approximately 150 years old. A tree large enough to cut one 12-inch by 12-inch by 16-foot bridge stringer is 170 years old. Whether it is bridge timbers, piling, crossties, or lumber for car building, the railroads require the very best kinds of wood and the highest quality of those kinds.

The products required are the result of slow growth. White oak and longleaf pine, the favorite timbers for railroad construction, grow more slowly than any other timbers of their respective classes, and the best qualities of white oak and longleaf pine are found in those individual trees which have had the slowest and most regular growth. Because young trees of these kinds are so long in reaching marketable size it will be comparatively easy to exhaust the available supply of these timbers. Growth is a smaller factor in offsetting cutting than is the case in many other trees.

The demand upon these well known construction timbers by railroads and also by other industries has constantly increased. The supply, not greatly replenished by growth, has diminished year by year until there is a present shortage of white oak and an exceedingly heavy strain upon the supply of longleaf pine. How prices have risen during the past five years need not be

*Read before the Railroad Club of Pittsburgh, Pa., December 28, 1906.

pointed out to gentlemen who have been painfully in touch with their upward course.

The situation in brief is this: The railroads are large users of classes of timber in which there is an imminent shortage. Railroad construction is founded on the use of these timbers. Any change to other classes of wood or to other materials means experiment, the outcome of which is uncertain. But regardless of the outcome of experiments some change is inevitable. White oak can not be used when it ceases to exist.

Accepting the idea that there must be some change in the use of wood by the railroads, let us consider in what direction a satisfactory rearrangement seems most easily possible. In that direction experiments should be made. The problem is one of concern to both the railroad man and the forester, because both want to see wood used only where it is the best possible material. In my opinion, Mr. J. A. Atwood was exactly right when, in the September meeting of this club, in speaking of railroad ties, he said: "If there is a large advantage on account of stability in service and safety by the use of steel ties over wooden ties, of course the steel tie is what you want. The railroads want perfect track as nearly as possible, and we can afford to pay whatever it costs to get the best track."

So far as wood is the most acceptable material in railroad work let us use it and let us bend our energies toward making safe an adequate supply of it. So far as its place can be filled better by some other material let that material be adopted as rapidly as conditions will permit.

In car building I understand that wood is rapidly being supplanted by iron and steel in the construction of coal, tank and flat cars, and to some extent, in cars for passenger service. Box, stock and refrigerator cars, which form more than half the freight cars in use, are, according to my understanding, still made almost entirely of wood. It is important that the railroads determine whether these classes of cars can, with advantage, be made wholly or in part of steel rather than wood. If they can be so made then car shops should turn their attention to that form of construction. If they must be made of wood then we must mark down an item for the supply of which we must look to the forest.

Railroads use wood extensively in the construction of their station buildings, warehouses, and connecting approaches and platforms. From the view point of an American desirous of the best things for his country, and of a forester aiming to put wood to its highest use, I want to say that I think the wooden depot with its attendant buildings and its setting of wooden walks and platforms has already outlived its usefulness, even in the smallest villages. Immediate economy undoubtedly has been the controlling factor in this kind of building, and were this use of wood alone involved, we should all surely welcome such a rise in the price of timber as would make it economical to use for station buildings brick, stone or concrete, and for walks and platforms brick, gravel or cement. As railroads move toward permanence in track construction they can surely afford to move with equal or greater rapidity toward permanence in station construction.

In this connection let me invite attention to the possibility of employing some other material than wood in the flooring of wharves and docks. The best quality of wood is used in great quantities for this purpose, and I believe that wood is about the only material used. Its substitution by some permanent material, if found possible, would seem highly desirable. If substitution is not practicable, then would it not be advisable to use, instead of board flooring, a pavement of creosoted rectangular wooden blocks, with the blocks laid on end as in bridge and street pavement?

In bridge construction there is a general movement toward the replacement of wood with masonry, steel, or concrete, even in small structures. These, after thorough trial, have evi-

dently proved the more acceptable materials. In spite of this tendency, the Committee on Wooden Bridges and Trestles of the American Railway Engineering and Maintenance of Way Association claim that "It will be a very long time before wooden trestles cease to be used on most of our railroads." Without technical knowledge upon the subject, it has been my personal observation that the ballast-covered wooden bridge is a favorite form of construction on many railroads, and that change from it to more permanent types of construction is in many localities taking place very slowly. A large amount of high grade timber is used every year in bridge and trestle construction. This timber should be made as permanent as possible by preservative treatment. Such timbers do not, as a rule, wear out; they deteriorate by action of the weather and they decay. A treatment which makes them resist weather action and decay will correspondingly increase their service. Railroads in the West and South are treating bridge and trestle timbers quite extensively. Even when the South can no longer be depended upon for heavy timbers the railroads of the West will use bridge timbers in great quantities.

The wooden pile is an article which, so far as I am informed, has not been successfully substituted. Regardless of what may be done to replace wood in other situations, it seems that the wooden pile must remain in use indefinitely. A vast quantity of timber is annually cut for piling, and the worst of it is that these fine poles—the best product of the forest—have often vanished within a few months before the onslaught of marine borers when placed in brackish water, or they have decayed within a few years in situations favorable to the growth of injurious fungi. With rising prices, we are passing out of conditions which have made such methods practicable. We must use wooden piles, but we cannot afford to place them at great expense and then allow them to be consumed immediately by insects or fungi. They must be protected. Experience has taught that the best protection against both insects and decay is a thorough impregnation of creosote. A good quality of creosote stays in the wood indefinitely, and so long as it is there in sufficient quantity neither borers nor fungi will attack it. In economizing in the use of wooden piles, then, we must look, not to substitution, but to the continued use of wood with the best possible protection.

Another class of railroad timbers which must be considered is made up of telegraph poles and fence posts. These must be had in considerable quantities, and the only satisfactory material from which to make them is wood. As in the case of the wooden pile the problem is, in my view, one, not of substitution, but of protection. Except in the Southern States, where conditions are very unfavorable, the telegraph pole and the fence post, unlike the pile, require protection only for a few feet at the ground end. Decay takes place in a damaging manner only over that part from a few inches above to a few inches below the surface. That is the only part which it is vitally necessary to treat. This simplifies the problem of treatment in one way, but complicates it in another. It makes it possible to use less of the preservative, thereby reducing expense, but it necessitates equipment not found in the ordinary treating plant. Without stopping to discuss the detail of operations, however, which it is not the purpose of this paper to present, let me say that the Forest Service has made careful and extensive experiments in the butt treatment of both poles and posts, and the results warrant belief that it is entirely practicable. With relatively small expense, a penetration of one-half inch to two inches can be secured. One telephone company is already taking up this form of treatment, and probably within a few years it will be in common use.

The subject of railroad ties is one in which this club is vitally interested. No feature of the shortening timber supply is being discussed to-day with

more seriousness than the scarcity of ties.

On the basis of reports from railroads representing 97.1 per cent of the trackage of the country, the Forest Service found the total number of ties purchased by steam roads in 1905 to be 81,500,000, 18.5 per cent of which were used for new track and 81.5 per cent for renewals.

Oak, principally white oak from the Central and Southern States, furnished 49.5 per cent of these ties. Pine ranks next in importance, with 23.5 per cent; and while the proportion which is to be given to the different kinds of pine cannot be definitely stated, it is shown from the reports that more than three-fourths of the pine ties reported are of Southern yellow pine. White and Norway pine should be credited with from 3 to 4 per cent, and the Western pine of the Rocky Mountain and Pacific Coast regions, with from 17 to 18 per cent. Cedar ranks third, with 8.9 per cent, followed closely by chestnut, with 6.1 per cent. Both of these species are good tie woods, and would figure more largely in the total production were it not for the limited distribution and supply of each.

Statistics are lacking for a comparison of the present output of ties with the number from each kind of timber in other years, but it is probable that were they available it would be shown that the number and proportion of the pine ties have increased materially within the last decade. Correspondingly, the proportion of oak ties would doubtless show a decrease for the same period.

The four leading kinds of timber for ties are oak, pine, cedar, and chestnut, which, combined, furnish 83 per cent of the total number—oak and pine alone furnishing 68 per cent. Next in rank is the red fir of the Pacific Coast and Rocky Mountain region, with 4.6 per cent; followed by the cypress of the South, with 4.5 per cent. The tamarack, or eastern larch of the New England and Lake States, and the eastern hemlock are the only other species credited with more than 1 per cent of the total number. Beech, birch, and maple were reported in amounts of less than one-tenth of 1 per cent each. The miscellaneous classification includes a number of woods, among which the most important are red gum, black locust, elm, hickory, and red cedar. Thus some twenty kinds of timber enter into the production of railroad ties, but of these only seven are, at present, important.

This statement shows that a strong tendency toward the use of other woods than oak, cedar and chestnut has already set in. Had we the figures, the increased proportion of Southern pine would unquestionably be surprising. Several other woods of the list will furnish greatly increased figures within the next few years. Red fir, cypress, tamarack, hemlock, redwood, and western larch have the properties of good tie timbers.

In the September meeting of this club one of the members, in discussing the merits of steel and wooden ties, said:* "While I believe that the best tie is a first-class white oak tie, 7 inches thick, 9 inches face, 8 feet 6 inches long, treated with some preservative, yet we all know that such ties are very scarce, and the railroads are about facing the problem of purchasing ties of other material than wood. We need not stop at this time to state just why an oak tie is better than a steel tie. The reasons are many. The superiority of white oak ties is generally recognized by railway engineers in charge of maintenance of way, and the advocates of steel ties do not deny this superiority. The purchase of steel ties is being advocated because timber cannot be procured in sufficient quantities to supply the demand for cross ties. It is no longer possible in the United States to purchase 80,000,000 first-class cross ties per year. The supply of durable timber is inadequate."

If the first-class white oak tie has such manifest advantages over the steel tie I am not certain that we must decide for the latter because white oak is growing scarce. It should be de-

*Mr. Edwin F. Wendt.

cided first whether other woods can be so protected and used as to obtain the serviceableness of white oak.

Railroad practice is working in this direction. Tie plates have been introduced with marked success on many roads for the protection of soft wood ties. A very great advance is being made just now toward the preservative treatment of ties. Ten per cent of the ties used last year were treated. All efficacious treatment helps, because it largely eliminates decay, which has been the greatest factor in weakening ties. There is ground for believing that by certain forms of creosote treatment the tie can be kept continuously at its maximum hardness and strength. The form of spike can be so improved that the union between the tie and rail will be firmer, and the tie thereby protected. The better ballasting of the track will also protect the tie.

My point is this: These means of protection will bring the tie of other woods approximately to the white oak standard, and all these means of protection can be accomplished by most railroads more easily than the change to the steel tie.

If we change from the wood to the steel tie we should do so only because all around steel is the best material for the purpose. If steel or concrete or any other material actually proves better than wood then that material ought to be adopted. If wood remains the most acceptable tie material we ought not to discard it on the ground of present scarcity.

One point regarding the supply of wooden ties should be carefully borne in mind. Present scarcity does not necessarily mean future exhaustion. A mineral once exhausted can never be replaced. A forest can be grown anew out of the ground. It is, therefore, a safer thing in the long run to depend upon.

Timber is at present scarce, and it will become still more scarce inside of twenty years. But the timber regions of this country are well distributed, are great in area, and are of immense potential productiveness. With adequate protection and care the forests will produce all the wood which will be needed even for the ultimate industrial development of the country.

In my opinion the present situation is not to be met by hastily abandoning wood in favor of some other material of unproved acceptability, which may also in time become scarce; it is to be met first, by the use of other materials where we know they are better; second, by the best possible protection to the wood where it proves the best material; third, by protection and care of the forest in order that nature, by its own process of growth, may, through all time to come, supply the wood needed by the industries.

FINANCIAL RESULTS OF FOREST MANAGEMENT

As Shown by the Saxon and Prussian Forests

BY

BERNARD EDUARD FERNOW

HISTORY repeats itself, at least in general aspects. It if were not so, the practical value of accumulated human experience would be lost. It is not merely academic interest, therefore, that attaches to a consideration of the accomplishment of other nations or other times. If we read the past aright, we shall have at least a hint of what will most likely happen to us under similar conditions.

The history of the forest is no exception to this general truth. From the experience of other nations we can

prognosticate what will happen with us, provided we make proper allowance for difference in surrounding conditions.

The question of financial results from our proposed forestry practices is one that, like all financial questions, can be answered only for each individual case. Even in Germany there are still places and cases where forestry practice appears, at short range at least, a questionable financial proposition. But, broadly speaking, and considering the average at long range, the profitableness of forestry practice is becoming each year more and more evident, and, however satisfactory the results appear now, there are good reasons to warrant the expectation that they are bound to improve still further, and that the maximum return of a hundred years' patient and persistent forest policy is still in the future.

One hundred and fifty years ago, Germany found herself in very much the same condition, as regards her forest resources, as we are to-day in the United States: all accessible portions more or less culled, or in poor coppice, burnt over and damaged by cattle, the valuable virgin timber mostly confined to distant and inaccessible locations.

BERNARD EDUARD FERNOW

Sporadic attempts existed here and there at protection, at regulation of the cut, at conservative lumbering, and still more sporadic attempts at reforestation.

The difference from our present conditions was the absence of railroads, hence more importance attached to local supplies; the absence of coal, hence closer utilization of firewood; the absence of the intense industrial development, hence less demand for building material, and less rapid increase of consumption. Finally, ownership conditions were different, much of the forest area being in strong hands—governments, corporations, and large landed proprietors, who could, if they would, apply conservative methods.

Yet, until the beginning of the nineteenth century, reduction of supplies without adequate reproduction proceeded, and around the year 1800 the wood famine had become acute, giving rise to the same kind of agitation and literature which we have experienced, even to bringing in the catalpa and other such small rapid growers as the saviors of the nation.

Relief came through the development of coal, and through railroad construction, which made untouched sources available.

Then the forester could impress the value of his methods, which make provision for a future generation at the expense of the present—*always!* Then the two great lights of forestry illumined the horizon, Cotta, the apostle of silviculture, and Hartig, the preacher of organization. The former, the greater of the two, because more versatile, became the head of the Saxon State Forest Administration; the latter, one-sided in his views regarding silviculture, became the great organizer of the extensive Prussian forest reserves.

It is of interest to trace, briefly, side by side, the progress with regard to financial results, of these two administrations, the one intensive on a relatively small area, the other extensive on a relatively large area, the two, although in part adjoining, presenting absolutely different conditions.

The Saxon Forest Administration, with only 400,000 acres, located largely in mountainous territory, with spruce the main timber, in a densely populated, industrially highly developed section, hence rendering intensive management possible, may be compared to our New England conditions.

The Prussian forest area of nearly seven million acres, stretching from the Russian frontier on the Baltic to and beyond the Rhine, naturally exhibits a much greater variety of conditions, both in forestal composition and industrial development. It is, to the largest extent, a plain, pine country—nearly 70 per cent—the mountains mostly covered with hardwoods, large areas in the east even to-day hardly opened up and permitting only very extensive methods, while other parts, like the pineries of the Mark and the mine districts of the West, invite intensity of management. A combination of our Southern pineries with some of our Middle Atlantic and Central States would give us a picture of somewhat similar conditions.

In both cases, wastes and mismanaged woods formed a considerable part of the property. Hence the area of exploitable timber had to bear the burden of putting the wastes and mismanaged areas in condition.

Even now, at least in Prussia, the whole area is by no means in the best productive condition, hence, for this reason alone, the average of financial results per acre is still rising rapidly as the actually productive area increases, and the expenditures for permanent improvements like roadbuilding, surveying, districting, planting of wastes, etc., fall away.

Naturally, prices of wood have appreciated, and part of the increase in financial yield is due to this fact, but closer scrutiny develops unmistakably the advantageous results of forest management.

These results, it must be understood, are based upon the principle of sus-

tained yield, that is to say, they are attained by harvesting as far as practicable only the wood interest, the increment, without decimating the wood capital which corresponds to the accepted rotation.

Since, however, at least in Saxony, rotations have been lowered during the last 50 years, an amount of timber—the older age classes of the longer rotation—has become available, improving the per acre returns, and hence the difference to the advantage of the Saxon management compared with the Prussian is actually not as large as it appears.

The test of a properly conducted forest management on the basis of sustained yield, is the proportion of age classes. Perfection is attained when these in the different management classes, coppice or timber forest, are alike. In Prussia the age-class conditions are about as follows:

Prussia: Over 100, 13; 81-100, 13; 61-80, 14; 41-60, 18; 21-40, 19; under 20, 19; cleared, 4. (Age-class conditions in per cent.)

These figures show a conservative management, and a close enough approach to the ideal.

Without going into details for Saxony, the statistics of that administration show that from decade to decade the older age-classes over 40 and 60 years have increased steadily in area, except in the last decade when the oldest age-classes were reduced in lowering the rotation, but are still above normal. At the same time the quantity and the character of the timber standing was increased, while the cut was also continuously increased. In 1897 it was figured that the value of the growing stock was increasing annually by 1.3 per cent.

A second test is the increase of cut per acre while maintaining the wood capital as exhibited in the age-class proportion.

In Saxony the cut increased during the years from 1820 to 1890 just 50 per cent, and up to 1904 has increased by another 5 per cent, namely, to 93 cubic feet per acre, the increase through the whole period being at the rate of ½ per cent annually.

In Prussia the increase is still more pronounced. While in 1830 the cut was 20 cubic feet per acre, and in 1865 increased only to 24 cubic feet, in 1890 it was 52, and in 1904 it had grown to 65 cubic feet; forest management had increased the average acre production in 75 years more than threefold!

Another test of efficient management is the proportion of saw timber produced (or else the timber wood per cent). Saw timber production is, to be sure, influenced by change in standard of the commercial log, but timber wood per cent, which refers to the "workwood" of 3-inch size and over, is a more permanent standard.

The workwood per cent in Prussia rose in the years from 1830 to 1865 from 19 per cent to 31 per cent, and to 54 per cent in 1904, so that not only the quantity of wood, but the quality was in those 75 years increased nearly threefold.

In Saxony, the intense industrial development led earlier to intensive management, and hence the improvement was more rapid; besides, relying mostly on spruce, the workwood per cent would be naturally higher. Here the proportion rose during the period from 1830 to 1865 from 26 to 56 per cent of the total cut, and is now 66 per cent.

Now, having pointed out the influences which, outside of the increase in wood prices, are reflected in the financial results of forest management, we may briefly turn to the changes in revenue which have taken place from period to period.

Corresponding to the increase in quantity and quality production, but also influenced by advance in prices, the net financial result in Prussia rose from about 28 cents per acre in 1850 to 72 cents in 1865, to $1.58 in 1900, and to $2.50 in 1904. In other words, the net income per acre nearly trebled in the first 15 years, and again more than trebled in the next 35 years, and

is lately increasing at a more rapid rate.

Meanwhile wood prices from 1830 to 1865 had only doubled, and up to 1904 had not quite trebled, so that the profitableness of the forest management outside of price advances is amply demonstrated, for during that period the revenue improved tenfold, or at the rate of 3 per cent per annum steadily. If the improvement of the property itself may be assumed to have proceeded at the same rate as we have seen it improve in Saxony, namely, at 1⅓ per cent, forest management has proved itself a 5 per cent investment in the long run.

The result has been attained by persistent increase in efficient service. For the first 20 years of the period data are lacking, but from 1850—when the expenditures were only a little over 25 cents per acre, and the net revenue represented 48 per cent of the gross—to 1865, the expenditures had increased over 50 per cent, namely, to somewhat over 40 cents per acre, and the net revenue to 64 per cent of the gross returns. During the following period to 1904 the expenditures were increased to four times, so that they are now $1.61 per acre, while the net revenue represents still 61 per cent of the gross, and, as we have seen, was over $2.50 per acre, this result having been attained with stumpage price averaging $7 to $8 per 1,000 feet board measure.

In Saxony, the present net revenue amounts to $5.30, a very considerable excess over the Prussian results, yet by no means the highest, for Würtemberg produces nearly $6.00, and several smaller forest administrations over $6.00 per acre. The reasons for this greater production we have already stated: a smaller area, more favorably located to market, and mainly spruce, which is the largest producer of values, and as a consequence of these favorable conditions also a more intensive management, which allows planting more generally, and the utilization of thinnings. In 1820 the revenue was less than $1.00, by 1850 it had more than doubled, by 1880 more than quadrupled; it is now, after 84 years, more than 5 times what it was when forest management was begun in earnest.

It is interesting to note that while the actual results are very much larger than those of Prussia, the rate of improvement in revenue during the last 55 years is very much smaller. For Saxony this rate was not quite 2 per cent per annum, while for Prussia it was nearly 4½ per cent. It is therefore evidently not a matter of efficiency that has produced the difference.

Just as in Prussia so in Saxony, but somewhat more rapidly, namely, at the rate of about 1½ per cent per annum, as against 1 per cent, the expenditures were increased. Indeed, it would appear that in the last 24 years the Prussian administration has overhauled the Saxon, for in spite of the superior situation of Saxony each dollar of expenditure now produces nearly the same results in the two administrations, while formerly the efficiency in Prussia was less, as the following comparison shows:

One dollar expenditure produced

	in Saxony *Net*	in Prussia *Net*
1850.....	$1.51	$1.25
1880.....	2.00	1.05
1904.....	1.77	1.66

If further proof were needed to show that forest management is profitable in the long run, every other German state forest administration and many private ones could be adduced.

An acreage of 15,600,000 of German state, municipal, and private forests, lately canvassed, produces an average net revenue of $2.40 per acre annually. In other words, every acre of this property, good, bad and indifferent, productive or unproductive, represents a capital of $50, paying 5 per cent interest, and this constantly improving.

It must not be overlooked that these results have come largely from non-agricultural lands, the sandy plains, the

swamps, the rough mountain slopes, and from forests which in part at least were mismanaged like ours.

Can we expect to attain the same or similar results?

We ought to do much better! For we have the hundred years of experience of our friends across the water to draw on, and we can avoid many of the mistakes which they have naturally made and paid for.

It is one of the misfortunes of the forester's work—perhaps a lucky thing for the individual forester—that the mistakes are often not found out until a generation has passed and are then difficult to mend. The more need for studying the forest history, the results of a hundred years of mistakes and successes.

Those who in patriotic over-confidence proclaim that the methods developed in a century's endeavor are not applicable here have failed to grasp the essentials of those methods, and are apt to fail in producing the silvicultural, and that means the financial, results they promise.

In conclusion we must accentuate that these financial results are long in coming. It was the early recognition of this truth by the European governments that has produced the results: spending in the past has enriched the present and the future.

DEMAND FOR THE PASSAGE OF THE APPALACHIAN-WHITE MOUNTAIN BILL

THE SOUTH IN EARNEST.

THE attention of any who may have thought the South indifferent to the Appalachian bill is specially called to the following petition:

"To the Members of the House of Representatives.

"Gentlemen:

"We, the undersigned, do respectfully request of you that you exert every possible effort and use all your influence to secure the presentation and passage of the Bill now before the House of Representatives for the establishment of two forest reserves in the East, to be known as the Appalachian and White Mountain Forest Reserves. This Bill, having passed the Senate and having been recommended to the House without dissent by the Committee on Agriculture, we desire your personal influence in securing its passage at this short session.

"Delay in the passage of this Bill will mean not only that all the work hitherto accomplished will have availed us little, but also that, meanwhile, certain interests which it will be the more difficult to deal with in the future are rapidly becoming intrenched in this territory in question, and land and timber values are daily increasing. Moreover, due to an increasing activity in the wasteful and careless denudation of the mountains, devastating floods will occur with greater frequency, and irreparable damage will continue to be done to agricultural interests and to those manufacturing interests which are so largely dependent on the water-powers of our streams.

"We hope, and again respectfully urge, that you will permit no time to elapse after the opening of Congress before bringing this matter collectively and individually to the attention of the Speaker."

This petition bears 93 signatures, including those of three governors, five state officers, three mayors of cities, four county officers, one board of trade, one water, life and power company, one oil company, two electric companies, three power companies,

four mills, six manufacturing associations, seven banks, and a galaxy of business and professional men representing the very flower of the South.

Following is a second petition:

"To the Members of the House of Representatives from the Southern Appalachian States.

"Gentlemen:

"In regard to the Bill now before the House of Representatives for the establishment of the two forest reserves in the East to be known as the Appalachian and White Mountain Forest Reserves, we, the undersigned, request your earnest efforts in its behalf, believing that the passage of this bill will be of infinite value to the various States in New England and the southern Appalachians. We, therefore, desire your personal influence in securing its passage in this short session, as it has already passed the Senate and been unanimously recommended to the House by the Committee on Agriculture.

"It is the opinion of those who have studied this question that a bill creating these forest reserves must ultimately be passed, and as any delay in action will necessarily increase the cost to the Government of the formation of these forest reserves, it is economy on the part of Congress to pass the present bill. The main reason, however, for immediate action is to prevent all the work hitherto accomplished from having to be done over and to prevent further denudation of the mountain slopes, which, if not checked, will go on more rapidly, causing irreparable damage, not only to the water-powers of the country both north and south, but also to farm lands, roads, railroads, etc.

"We, therefore, request that you will give this matter serious and immediate consideration and individually and collectively bring this to the attention of the Speaker and support the bill on the floor of the House."

This petition is signed by representatives from six states. Among the signers may be mentioned: for Maryland, the Governor, State Geologist, State Highway Engineer, and the President of Johns Hopkins University; for North Carolina, the Governor, Secretary of State, Auditor, Treasurer, Attorney General, Chairman of the Corporation Committee, another member of the same Committee, the Secretary of the State Board of Agriculture, the State Geologist, the Mayors of Charlotte and Asheville, and the Secretary of the Appalachian National Forest Reserve Association; for Georgia, the Governor, Governor-elect, Secretary of State, Treasurer, School Commissioner, Commissioner of Agriculture, State Librarian, State Geologist, and Attorney-General; for Alabama, the Governor and his Private Secretary, the Auditor, Secretary of State, Superintendent of Education, State Geologist, Deputy Insurance Commissioner, Clerk of Supreme Court, and Librarian; for Virginia, the President of the University of Virginia; for West Virginia, the Governor, Secretary of State, Superintendent of Schools, Auditor, Treasurer, Attorney-General, Tax Commissioner, Commissioner of Banking, State Geologist, Clerk of the Superior Court, and four Judges of the Supreme Court. With these are associated numerous other distinguished names.

The Engineering Society of the Carolinas has passed the following resolutions:

"*Whereas*, The Engineering Society of the Carolinas, having considered at a special meeting held on the 13th day of December, in the City of Charlotte, N. C., the proposed Bill for the establishment of the two forest reserves in the East to be known as the White Mountain and Appalachian Forest Reserves, and

"*Whereas*, We, from the nature of our profession, the more fully realize the immeasurable benefits and advantages that may accrue to the people of the states we represent, and to those of the neighboring states whose streams have their sources in the proposed reservation, by the control and

prevention of further devastating floods, the discontinuance of the wasteful destruction of timber, and the resultant needless erosion of valuable farming lands, the resultant conservation of our magnificent resources, for the economical development of power, and the reduction of appropriations for maintaining navigable our streams in their lower levels, and

"*Whereas*, This Bill having passed the Senate and having been recommended to the House of Representatives without dissent by the Committee on Agriculture, be it therefore

"*Resolved*, That we, the undersigned, officers and members of this Society, do hereby in endorsement and approval of this Bill respectfully urge on the representatives from this and the neighboring states that they make every possible effort and use all their influence to secure the immediate presentation and passage of this Bill."

These resolutions are signed by the President, First and Second Vice-Presidents, Treasurer, Secretary, Assistant Secretary, three Directors, and twenty-two others.

NEW ENGLAND STILL RESOLUTE.

From New England come the following two additional sets of resolutions:

Resolutions by Boston Chamber of Commerce, at its annual meeting, January 15, 1907:

"*Whereas*, A bill for the purchase of Federal forest reserves in the White Mountains of New Hampshire and in the Southern Appalachian Mountains is now pending before the Congress of the United States; and

"*Whereas*, The present unwise cutting of the White Mountain forests under private ownership results in serious injury to their future growth, to the water-powers of four great New England rivers, and to the scenic value, healthfulness and attractiveness of our lake and mountain regions; and

"*Whereas*, The beauty and usefulness of these two vast mountain regions are national in character, and of as great importance to the people of the Atlantic slope as the 100,000,000 acres of forest preserves already established by the General Government for the immediate advantage of the people of the Pacific slope; now therefore be it,

"*Resolved*, That the Boston Chamber of Commerce hereby expresses its earnest approval of this bill, and urges its passage by Congress; and that copies of this resolution be forwarded to our Senators and Representatives in Congress."

Resolutions by General Assembly of State of Connecticut:

"State of Connecticut, General Assembly, January Session, A.D. 1907.

RESOLUTION Concerning Forest Reserves in the White Mountains.

RESOLVED BY THIS ASSEMBLY:

"*Whereas*, There is now pending before the House of Representatives of the United States a bill providing for the establishment by purchase of federal forest reserves in the White Mountains of New Hampshire and the Southern Appalachian Mountains, be it

"*Resolved*, That it is the sense of the General Assembly of Connecticut that the establishment of these reserves is wise public economy and that it is the opinion of this body that the interests of the State of Connecticut will be furthered by the protection of the forests at the headwaters of the Connecticut River, and that this General Assembly urge upon Congress to pass the bill."

It will be remembered that, prior to the opening of the present session, a strong petition was circulated in New England and signed by the Governors of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut; also, by companies and concerns representing vast industrial interests, and by a cluster of the most truly representative men in all New England.

Governor Guild, of Massachusetts, was the first to sign the New England petition to the members of the House of Representatives from the several New England States, urging the passage of the Eastern Reserves bill. In

addition, he made this further statement at the State House with reference to the matter:

"The public is not generally aware that at the present time all the forests on the northern side of the Presidential range are swiftly disappearing before the ax of the lumberman. It is only a question of two or three years when this beautiful forest district of New England will be ruined.

"The preservation of these forests is not only of direct importance to Maine, New Hampshire and Vermont, but of almost equal importance to the other New England States. The sources of the great rivers whose water-power turns the millwheels of New England are almost all in this forest region, and the destruction of the forests means, as it has meant elsewhere, the drying up of water supply in summer and disastrous freshets in the late winter and early spring.

"Our Massachusetts congressmen, and especially Hon. Samuel W. McCall and Hon. John W. Weeks, have taken up the cause of the preservation of the forests from a reckless destruction, pregnant with dangerous results in the future. The large manufacturing interests and the friends of forestry, North and South, trust and believe that Congress may be willing to give to the eastern part of the country the same consideration that has already been accorded to the Pacific coast and the Rocky Mountain region of the West. If the Yellowstone Park can be preserved for the people by the National Government, if vast areas of alkali land can be made fertile by a national law for irrigation, it certainly seems proper to ask for national aid in the preservation of the forests of New England."

NOTES ON ROBINIA NEO-MEXICANA

BY

FRANK J. PHILLIPS

Forest Assistant, Forest Service, January 26, 19c7

THE geographic distribution of this species and its general botanical characteristics are best given in Sargent's *Manual of the Trees of North America*, and the following notes are entirely supplementary to that information. During three months field work in the Jemez and the Lincoln Forest Reserves special note was made regarding the growth and local distribution of this species. It was not found in the Pecos River Reserve, although careful search was made for it and it probably occurs as a shrub in that region.

LOCAL GEOGRAPHIC DISTRIBUTION.

The species grows along the banks of mountain streams and on moderate to steep mountain slopes. It was found in the Lincoln Reserve at a maximum elevation of 9,700 feet approximately two miles north of Sierra Blanca Peak. This maximum elevation for the locust is the minimum elevation for the sub-alpine fir in the same region and is 2,700 feet higher than reported in Sargent. At 9,600 feet the locust showed little or no signs of dwarfing and it is probable that it will grow even still higher than reported above.

Site requirements embrace a rich, porous soil which is well supplied with water, but also well drained. Depth of soil may be extremely variable, as the tree was found growing luxuriantly on slopes where the soil is 2 inches to 1 foot in depth, and in valleys where the soil reaches a depth of 6 to 8 feet. Soil may be very rocky as on slopes, or lacking rock as in the sandy adobe of the valleys. The slope type occurs almost exclusively on slopes with a

Interior of best grove: Nogal Canon

northern exposure, although it is found occasionally on slopes facing the east or the west. These exceptional cases occur only in limited coves where better moisture or shade conditions compensate for the less favorable slope.

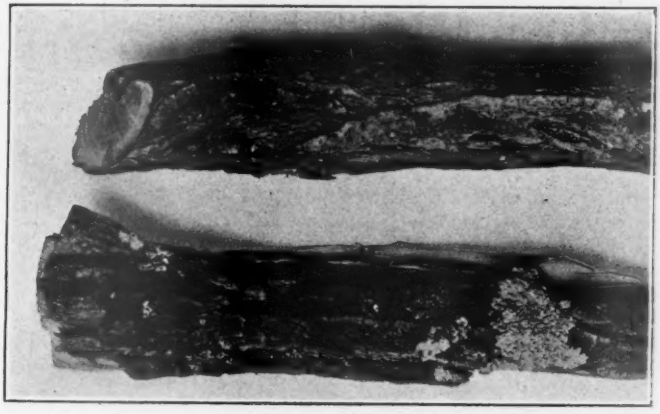
ASSOCIATED SPECIES.

In the valleys the species is usually found with willow, aspen, alder, Mexican walnut and similar stream species, while on the slopes it is found on open spots or as undergrowth to sparse forests, usually bull pine. As

Exterior of same

undergrowth it is found most frequently with Quercus gambelii and Quercus undulata.

Near Senorita the species was found growing on a steep, north slope at an elevation of 9,500 feet, where it formed a limited but moderately dense stand beneath a heavy forest of red fir, white fir, and Engelmann spruce. The largest individual in this understory had a diameter of 4.2 inches and a height of 32 feet. In one exceptional case near Bland the locust formed a dense understory beneath a stand of Engelmann spruce, white fir, and red fir of .9 density. This seems remarkable when the moderate tolerance of the species is considered.



Young bark and borer work

OPTIMUM DEVELOPMENT.

As a result of the present investigation the region of optimum development is considered to be in the Lincoln Forest Reserve and adjoining areas rather than near Trinidad, Colo., as stated by Sargent. In this region it usually occurs in limited stands, pure or mixed with Quercus gambelii. In an exceptional stand near the head of Nogal Canyon it covers approximately 50 acres to the practical exclusion of other species, and sample plots of the best portions of this stand, where there is a perfect crown cover, reveal 3,500 to 4,000 trees per acre, with diameters ranging from 3 to 12 inches and heights varying from 15 to 41 feet. Near Sierra Blanca at 9,600 feet elevation sample plots were taken of another pure stand, which covered about 8 acres, and which had a crown density of 7 to 8, showing 7,560 trees to the acre. The larger number of trees on this area compared with the former plots in Nogal Canyon is due to the smaller size of the individuals, as they ranged from 1-3 to 5 inches in diameter and had a height of 6 to 15 feet.

Several trees were noted at elevations between 9,400 and 9,600 feet, which had diameters of 12 inches, while the largest tree, which shows the possibilities of the species, was 14 inches in diameter breast high. The oldest stump counted was 12 inches in diameter at 1 foot above ground and revealed 114 years' growth. Undoubtedly there are numerous trees much older than this.

Open stand: Robinia Neo-Mexicana and Quercus gambelii.

TOLERANCE.

The tree is subjected to the most severe climatic conditions. Often it is found growing on the most exposed northern ridges where the wind-sweep is strongest and where few, if any, other species would survive. According to local report many of these sites do not have a longer growing season than 3 to 3½ months. Many of the trees showed the effect of winter kill-

ing on wood which had not hardened sufficiently.

On the whole the species may be said to be only moderately tolerant of shade and is closely similar in this respect to Robinia pseudacacia. It prefers open sites, and the exceptional cases previously cited are due largely to a better moisture supply.

FRUIT.

The fruit is well described in Sargent. The maximum length of pod, however, was found to be 6¾ inches and several were noted which were over 5 inches in length. Abortive seed are distinctly characteristic of the species, and a count of 200 pods collected from various trees is shown in the following table.

The figures in the body of the table show the number of cases in which there is the combination shown by the side column and top line. Thus: Of 2 good seeds and 3 abortive seeds in the same pod, there were 14 cases.

Number of good seed per pod.	Number of abortive seed per pod.								Total number of pods.
	1	2	3	4	5	6	7	8	
1	9	15	13	6	4	1	0	1	49
2	20	18	14	10	2	3	1	1	69
3	16	9	5	1	3	0	1	0	35
4	11	4	0	2	0	1	0	1	19
5	9	1	1	1	2	1	0	0	15
6	4	1	0	0	1	0	0	0	6
7	3	1	1	0	0	0	0	0	5
8	1	0	0	1	0	0	0	0	2
									200

RATE OF GROWTH.

In no case were specimens of this species noted which had made a growth comparable with that of Robinia pseudacacia. Stumps of 10 trees, under 50 years of age, and at an elevation of 7,200 feet, were measured and showed an average diameter growth of 1 inch in 14 years. Trees at lower elevations undoubtedly make a faster growth, while old trees at high elevation make a remarkably small diameter growth. Measurements on 10 stumps of coppice growth less than 25 years old showed a diameter growth of 1 inch in 6½ years. These measurements were not taken on a sufficiently large number of trees over diversified sites, hence are only a crude criterion as to general rate of growth. From general observation the species makes a slow to moderate height growth.

Sapwood varies from 1 to 6 layers of annual growth with an average of 2 to 3 layers. Several trees were noted where the sapwood formed a distinct line at 1½ years of annual growth.

Old Tree—largest seen; 14 inches, D. B. H.

FORM OF TREE.

Ordinarily the tree does not reach a sufficient size to be merchantable, but over numerous areas in the Lincoln Reserve it has been used for mine props, fence posts, corrals and fuel. It is characterized by a short bole, usually crooked, and an irregular, stag-headed crown of small size. On most mountain slopes a large percentage of the trees are dead on one side from the ground to top of crown, giving the tree a peculiar, storm-beaten appearance. Added to this is the characteristic clearing of lower branches which usually leaves a hole in the trunk surrounded by dead wood. This causes

an irregularity of growth resembling, somewhat, the form of the diamond willow.

ROOT SYSTEM.

There is close similarity between the root system of this species and that of the eastern black locust. It is distinctly lateral, and often in dense, pure stands of the species forms a perfect network through the soil. This makes the species of more than usual importance in conserving water on steep slopes, and in holding slope soil *in situ*.

MISCELLANEOUS.

It is well known that the locust borer so prevalent in the east does not attack the Robinia pseudacacia in the southwest. Special care was taken to look for borer work on Robinia neo-mexicana, and in nearly every slope stand evidences were found of borer work in dead wood and occasionally in live wood. Limited time, however, did not permit a detailed examination, and further study should be made along this line.

Further study should be made by planting seedlings and seed spots of this species to determine its value for conserving moisture and preventing erosion over large slope areas. Natural growth seems to indicate that it will be a species of local importance for use on planting sites in the Lincoln Reserve.

NOTE—Cuts in this article reproduced by permission of the Forest Service, U. S. Department of Agriculture.

AMERICAN FORESTRY ASSOCIATION

TREASURER'S REPORT

WASHINGTON, D. C., *January 8, 1907*

THE BOARD OF DIRECTORS,

THE AMERICAN FORESTRY ASSOCIATION.

GENTLEMEN:

I have the honor to hand you herewith my report as Treasurer of your Association for the period ended December 31, 1906, and submit as a part thereof the following Statements:

STATEMENT OF ASSETS AND LIABILITIES
As of December 31, 1906
EXHIBIT "A"

REVENUE ACCOUNT
EXHIBIT "B"

STATEMENT OF CASH RECEIPTS AND PAYMENTS
EXHIBIT "C"

STATEMENT OF MEMBERSHIP
As at December 31, 1906
EXHIBIT "D"

The period reviewed by this report covers thirteen months—December 1, 1905, to December 31, 1906, inclusive—as the end of the fiscal year of the Association was last year changed from November 30 to December 31.

Upon reference to the Statement of Assets and Liabilities, Exhibit "A," it will be seen that the net result for the period is an encouraging one, there being an excess of Revenue over Expenditures of $731.66 (see Exhibit "B"). This amount has been carried to Surplus, which account, at the date of December 31, 1906, shows the encouraging amount of $6,743.34 (see Exhibit "A").

From the Statement of Receipts and Payments, Exhibit "C," it will be apparent that the Life Membership Fees constitute a large part of the yearly income. Inasmuch as it is the policy of the Association to consider the moneys accruing from this source as a permanent fund, not to be used for current expenses, I would respectfully suggest—as I have recently done to your Executive Committee—that a

standing Committee be appointed by your Board to look after the prompt investing of these funds, in order that a maximum earning may be derived therefrom.

During the period 67 members were dropped for non-payment of dues, the amount of their arrears being $268.00. The dues outstanding at the date of December 31, 1906, are as follows:

2 Sustaining Members	$50.00
220 Annual Members	440.00
Total	$490.00

the greater part of which it is expected will be realized.

There is also included in my report for this year a Statement (Exhibit "D") showing in compact form the various classes of members at the beginning of the year, the changes and additions during the year and the present membership.

Respectfully submitted,
OTTO LUEBKERT,
Treasurer.

EXHIBIT "A" **BALANCE SHEET**

As of December 31st, 1906.

ASSETS.			LIABILITIES.		
CASH IN BANK:			BILLS PAYABLE:		
Union Trust and Storage Co.	$5,448 92		Commercial National Bank, Demand Loan	$2,000 00	
Less overdraft on the Commercial National Bank	421 90		Commercial National Bank, Demand Loan	2,000 00	$4,000 00
	5,027 02		ACCOUNTS PAYABLE:		
Petty Cash on Hand	11 00	$5,038 02	Forestry & Irrigation Pub. Co.	1,458 60	
BOND INVESTMENTS (purchase price):			M. M. Rothschild	28 50	1,487 10
2 Chicago & Eastern Ill. 5's	2,305 00		Total Current Liabilities		5,487 10
2 Minneapolis & St. Louis 4's	1,982 50		SURPLUS ACCOUNT:		
2 Japanese Imperials 4½'s	1,875 30	6,162 80	As at December 1, 1905	6,011 68	
DUES OUTSTANDING:			Add Net Revenue (carried from Revenue Account, Exhibit "B")	731 66	6,743 34
Annual	440 00				
Sustaining	50 00	490 00			
Interest Accrued		84 72			
POTOMAC ELECTRIC POWER COMPANY:					
Deposit for Electric Current		5 00			
FURNITURE AND FIXTURES:					
As per ledger account		449 90			
		$12,230 44			$12,230 44

EXHIBIT "B" **REVENUE ACCOUNT**

For 13 months ending December 31st, 1906.

EXPENDITURE.			INCOME.		
Magazine	$8,818 47		MEMBERSHIP DUES:		
Salaries and Clerk Hire	3,636 11		Annual, Received	$9,948 35	
Postage	3,347 20		Annual, Outstanding	440 00	
Printing and Stationery	1,188 13		Sustaining, Received	1 550 00	
Proceedings of Forest Congress	1,138 50		Sustaining, Outstanding	50 00	
Miscellaneous Expenses	235 53		Life, Received	6 700 00	
Rent, Insurance and Telephone	193 53				$18,688 35
		$18,557 47	Contributions		292 00
Balance, carried down		427 13	Exchange		4 25
		$18,984 60			$18,984 60
INTEREST:			Balance, brought down		427 13
Demand Loan		60 56	INTEREST:		
Balance, being Net Revenue, carried to Balance Sheet, Exhibit "A"		731 66	Bank	56 54	
			Bonds, Received	223 83	
			Bonds, Accrued	84 72	365 09
		$792 22			$792 22

EXHIBIT "C"

STATEMENT OF CASH RECEIPTS AND PAYMENTS

For 13 months ending December 31st, 1906.

RECEIPTS.			PAYMENTS.		
Balance, being Cash on hand at December 1, 1905		$1,631 68	Magazine		$6,341 42
MEMBERSHIP DUES:			H. M. Suter Pub. Co.		1,198 80
Old Members	$4,649 34		Forestry & Irrigation Pub. Co.		1,018 45
New Members	5,309 01		Printing and Stationery		1,192 57
Sustaining Members	1,546 00		Postage		3,347 20
Life Members	6,700 00		Salaries and Clerk hire		3,636 11
		18,204 35	Dues Reimbursed to Members		6 00
Contributions		292 00	Bond Purchase		1,875 30
Sale of Proceedings		62 10	Miscellaneous Expense		260 06
Sundry Sales (Type Metal)		31 14	Interest on Demand Notes		60 56
Demand Loans		4,000 00	Rent, Insurance, Etc.		232 96
Interest on Bonds		223 83	Furniture and Fixtures		357 40
Interest on Deposits		56 54	Balance, being Cash in Banks on December 31, 1906		5,027 02
Rent and Electric Light, received		39 43			
Secretary's Fund (Transfer)		8 53			
Exchange		4 25			
		$24,553 85			$24,553 85

EXHIBIT "D" **STATEMENT OF MEMBERSHIP.**

Thirteen Months Ending Dec. 31, 1906

MEMBERSHIP AS AT DEC. 1, 1905		CHANGES DURING THE PERIOD						ADDITIONS		MEMBERSHIP AS AT DEC. 31, 1906
Class	No.	Deaths	Resignations	Dropped	Not Found	Changed to other Class	Total Loss	During Year	Net	
Annual.....	2944	37	216	67	16	23*	336	2675	2339	5283
Sustaining.	20	1	.....	.....	.....	6†	1	47	46	67
Life	128	3	.....	.....	.....	.....	3	67	64	192
Patron.....	2	0	.....	.....	.....	.....	.....	.....	.....	2
	3094	41	216	67	16	.....	340	2789	2449	5543

*To Sustaining. †To Life.

Government Irrigation Work During the Month

Purchases Authorized

Authority has been granted to the Reclamation Service by the Secretary of the Interior to purchase, by informal contract under competitive proposals, the necessary equipment consisting of machinery for the generating of electricity and its utilization at the tunnel headings and other points on the Tieton project, Washington. The cost of the machinery is not to exceed $75,000.

The Secretary of the Interior has authorized the Reclamation Service to purchase power equipment to be utilized in the building of the Cold Springs dam, Umatilla irrigation project, Oregon, now being constructed by force account under the supervision of the Government engineers. The estimated cost of the machinery is $5,000.

Time Extensions

The Secretary of the Interior has granted an extension of time to S. R. H. Robinson to June 1, 1907, for the completion of his contract for the work of Schedule 1, main supply canal, Belle Fourche project, South Dakota.

The Secretary of the Interior has granted an extension of time to July 1, to Nohle & Mann, of Buford, N. Dak., for the completion of the work of constructing a unit of the Lower Yellowstone project.

Contract Let

On January 25 the Secretary of the Interior approved the bond in the sum of $45,000 and executed a contract with Theodore Weisberger, of North Yakima, Wash., for the construction of Schedules 6A and 7A of the main canal, Tieton project, Washington. The bid of the contractor was

in the sum of $230,371. The contract calls for manufacturing, furnishing, distributing and laying concrete shapes for canal and tunnel laying and for flumes.

Beware of Frauds

"The generous publicity which the press has given to the national work of Reclamation," said an official of the Department of the Interior, "is being taken advantage of by a number of shady promoters who are attempting to revive questionable irrigation schemes, especially in Arizona and New Mexico. The arid West has suffered greatly in the past by reason of the operations of this class of promoters, and legitimate private enterprise has suffered unnecessary hardship and delay in the prosecution of the laudable work of settlement and colonization.

"As every fake scheme works to the detriment of honest companies, the Government as well as the bona fide promoters is interested in driving out this brood of swindlers, who are seeking to fatten their pocket-books at the expense of innocent investors.

"Down in Arizona, a pseudo-religious corporation (organized, its principals say, 'for the extension of the true faith') has been deluding innocent people into buying water rights in an irrigation scheme which has as much chance of ultimate success as a lace curtain in a fiery furnace. The company has neither land nor water, and no hope of getting either. Yet the Government mails are full of letters from the victims asking for information. If these people had been as anxious to inquire before investing, they would not now be out of pocket. These inquiries indicate that the company is prosecuting its work largely through the religious press, a rather singular medium to use to perpetrate a swindle, and the victims seem to be generally from the East and the South.

"In New Mexico several companies are preparing to launch great works on streams, the waters of which were long ago appropriated and whose supply is not sufficient for the present needs of old canals.

"It is no province of the Government to warn these people, though it would seem properly the duty of the Postoffice Department to exclude their literature from the mails, when an investigation would show the fraudulent character of the schemes and the utter impossibility of their being carried out.

"One word of warning to all who are looking for investments in the West: Do not buy anything without carefully investigating. Do not buy water rights until you are convinced the water is there, and the company financially able to deliver it. If you are going to make a home in the West, do not buy until you investigate in person on the ground. The West is full of opportunities for homeseekers, and there are plenty of legitimate irrigation enterprises in which your investment will be safe."

THE MONTH IN GOVERNMENT FOREST WORK

National Forest Legislation

The agricultural appropriation bill, as reported by the House Committee on Agriculture, provides:

That forest reserves shall be hereafter known as National forests; that the Secretary of Agriculture may fix the names and designate the boundaries of National forests; that moneys may be received as contributions toward co-operative work in the protection and improvement of the National forests and expended for that purpose: that fish and game supplied to stock

the National forests or the waters therein may be transported and cared for by the Forest Service, and that $5,000,000 in addition to the appropriation for salaries and general expenses shall be immediately available to construct permanent improvements for the proper and economical administration, protection, and development of the National forests.

Co-operative Work The work of the Forest Service in California, undertaken in co-operation with the State, is now nearly finished. The field work in the study of cut-over lands is completed, and a market study of redwood, now in progress, will be completed by early spring.

The agricultural experiment station of Delaware has requested the Forest Service to make a study of forest conditions in the State and to work out a State forest policy. The necessary field work will probably be started toward the close of the winter or early in the spring.

The preparation of a working plan for a tract of 70,000 acres in Arkansas has been undertaken by the service in co-operation with the owners. The tract consists almost wholly of shortleaf and loblolly pines. The work, which will be under the direction of S. J. Record, will aim chiefly at devising plans for fire protection and conservative lumbering, with a view to a continuous annual supply of timber.

Fuel Wood All the Forest Supervisors in Montana, Wyoming, and Idaho have been telegraphed to do everything in their power to relieve the fuel famine. Every facility is given the ranchers to obtain wood promptly.

Planting A recent report by G. W. Peavy indicates that the field planting in the Santa Barbara Reserve last March was eminently successful. About 30,000 trees were planted on selected sites in the Santa Ynez watershed. Of this number, 44 per cent were alive on November 15. This result is particularly striking, since seven different species were used. The experiments show that careful selection of sites for the various species will do much to insure success. Of the seven species, incense cedar shows 82 per cent of live trees on November 15. The success with this species is attributed to the fact that these seedlings were planted in canyons and on north slopes, where conditions were extremely favorable. The average height of all the species planted was from 9 to 20 inches, and all the failures are attributed to drought.

Experimental plantations will be established in the San Luis Obispo Reserve this winter. Watershed improvement and timber production are the objects sought. The 25,000 trees used will be supplied from the Henninger's Flat Nursery.

State Co-operation A plan has recently been prepared by S. J. Flintham, in co-operation with the State of California, for planting on the cut-over redwood lands of the Union Lumber Company. This company controls extensive holdings in Mendocino County near Fort Bragg, and at the present rate of cutting have redwood timber sufficient to last from eighty to ninety years. The cut-over land, however, grows up to brush, and it is desired that it be restocked. Eucalyptus is the most rapid-growing species of commercial value, and the plan provides for a division of the cut-over land into planting sites, and contains definite recommendations for clearing and planting. Provision has also been made for the protection of the plantations from fire and for extensive planting of windbreaks for harbor protection. The company will raise the necessary seedlings in a nursery which will be established near Fort Bragg this winter under the supervision of the State Forester.

The whole project strikingly shows the awakened interest in California in eucalyptus planting for commercial timber production.

Fence Post Treatment H. F. Weiss has completed experimental treatments of lodgepole pine and aspen fence posts on Henrys Lake Forest Reserve. It has been demonstrated that round posts of these species can easily be made to receive a cheap and effective treatment which will greatly prolong their length of service and so render them more valuable than untreated posts of the more expensive species. An open tank, capable of holding about 50 posts and equipped with steam coils, or so arranged that fire can be placed underneath, is all the apparatus necessary to begin the treatments on a small scale. The work will be carried on by a local company on a commercial basis.

There are many sections throughout the Mississippi Valley and Rocky Mountain States where there is urgent need for such a treatment for fence posts and telephone poles of cheap but quickly decaying species, and it is planned to extend the work to other reserves as rapidly as possible.

Mine Prop Treating Plant As a result of experiments in the preservative treatment of mine props carried on by the Forest Service, in co-operation with the Philadelphia and Reading Coal and Iron Company, of Pottsville, Pa., John M. Nelson, jr., who has had charge of the experiments, has submitted plans which the company has drawn up for an open tank treating plant, with a capacity of about 800 cubic feet per day. Work on the construction of the plant will be started at once. The experiments, though not yet completed, have demonstrated that preservative treatment is practicable and economical, and that the methods which have been employed are applicable to similar conditions in other parts of the country.

Tie Plates, Screw Spikes, etc. The experimental work which the Forest Service has been carrying on in co-operation with the Northern Pacific Railway Company has resulted in the laying of a test track near Maywood, Wash. In this track the value of preservative treatment, tie plates, screw spikes, dowels, etc., will be practically demonstrated.

Tie and Telephone Treatments H. A. Paul, who, for several months, has been engaged in seasoning and treating arborvitæ poles and hemlock and tamarack ties at Escanaba, Mich., is now in Washington for the preparation of his reports. As soon as the weather permits, in the spring, the ties will be laid in a test track and the poles will be placed in an experimental line, in order that the results of the treatments may be definitely determined.

Addresses Delivered During January members of the Forest Service delivered addresses, as follows:

January 15.—Progress in Wood Preservation in 1906, Mr. C. G. Crawford, at meeting of Wood Preservers' Association, Memphis, Tenn.

January 16.—Statistics of Tight Cooperage Stock, Mr. H. M. Hale, at meeting of Tight Barrel Stave Manufacturers' Association, Memphis, Tenn.

January 22.—Opportunities in Pine Wood Distillation, Dr. W. C. Geer, at meeting of Yellow Pine Manufacturers' Association, New Orleans, La.

Wyoming Wool Growers' Association, Rock Springs, Wyo., January 15 and 16, Gifford Pinchot.

Wyoming Wool Growers' Association, Salt Lake City, Utah, January 17 to 19, Gifford Pinchot.

Current Topics Club, Central Y. M. C. A., Elmira, N. Y., January 21, E. A. Sterling.

American National Live Stock Association, Denver, Colo., January 22 and 23, Gifford Pinchot.

University Settlement Society, New York, N. Y., January 23, Louis Margolin.

Cincinnati Lumbermen's Club, Cincinnati, Ohio, January 26, Gifford Pinchot.

Connecticut Forestry Association, New Haven, Conn., January 29, E. A. Sterling.

HOW FAST ARE WE CUTTING TIMBER?

Impromptu Address at the Annual Meeting by Mr. George K. Smith of the National Lumber Manufacturers' Association

PRESIDENT WILSON, in his talk this morning, gave one sentence which I will refer to briefly. He said that he did not believe that the citizens of this country appreciate the rapidity with which the forests are being depleted. The lumbermen are giving the question earnest consideration, and several years ago began to agitate the question of determining, if possible, how fast this supply of timber is being drawn on. At the meeting two years ago a strong impetus was given to the movement, and following that, co-operation was started between the Forest Service and the National Lumber Manufacturers' Association to determine, if possible, and get a report from all the mills cutting lumber in the United States. Nearly 12,000 reports were received, showing that there was 30,000,000,000 feet of lumber cut in the United States during the year 1905. The work of gathering this information shows great progress, the Census Department having been brought into the field to co-operate, and it will do a great deal of the statistical work connected with gathering these figures. It is expected that by the time of the regular census in 1910 sufficient interest will have been aroused to get a report from every mill in the country. The associations which make up the National have taken a great interest in this work, and one member of the Association in the South has thought sufficiently well of it to put three young men in the field, who are visiting personally the mills, and will bring together data giving information as to the capacity of the mills, how much timber they have alive, and the cut. This work will be summarized in a report two years from now in New Orleans; and other associations will feel that they should not be left behind, and will probably do the same work in their districts.

I believe this is a report of progress which will help to answer the question how fast we are drawing on our forest resources, and I trust in the years to come we shall be able to make still better reports than this one.

PROGRESS OF FORESTRY EDUCATION

Remarks by Professor Henry S. Graves, of the Yale Forest School, at the Annual Meeting

I HAVE been asked to say a few words about the progress of forest education. This does not have an immediate bearing on the subject of this meeting, namely, the Appalachian bill, but it has an indirect bearing, because whatever this Association advocates, its carrying out is going to depend upon practical forestry. This Association and other Associations have been urging legislation and arousing public sentiment for a good many years, and, starting some ten years ago, they began to accomplish something. The country woke up. We found that we had practical work to do and practi-

cally no foresters to do it. Such a situation inevitably results in the first professional work being somewhat superficial and sometimes flimsy. We realized in the early days that as soon as we had work to do we must have foresters, and this led to the establishment of schools. Here again we were handicapped, because we could not get teachers who had experience and the ability to give instruction.

The present condition of forest education in this country is an exceedingly encouraging feature of the progress of forestry. The fact that some of our leading institutions are introducing efficient schools of forestry, and that these institutions are showing by the work they are doing that they have competent and efficient teachers is one of the most important features of the present condition of forestry. It means that we are building up a profession; it means that we are providing men who can assume the responsibility of handling the great problems which are placed upon our shoulders. The question was brought up to-day as who should have charge of the distribution of the fund of $5,000,000 which may be appropriated by Congress? The answer is, the Forest Service. And what is the Forest Service? It is a body of professional foresters—a body of professional men who are fully capable of handling an appropriation of this sort, and who can see the practical bearing of the question of education on every new project such as this Appalachian bill.

I think it may be fortunate that affairs in forestry have not progressed any more rapidly than they have, for this reason: viz., that we now have good schools, and are turning out good men who can assume the great responsibilities as they come along. I have been very much pleased, in looking over the catalogues of the different forest schools and in my correspondence with those in charge of them, to see how they have improved in efficiency. Harvard University has improved its school of forestry, making it a part of the new School of Applied Sciences. The University of Michigan and the University of Minnesota show marked improvement in the work which they are doing. We have not yet standardized our education in forestry. That will come soon. I think I can report from the standpoint of education that we are progressing rapidly, and are turning out better men every year.

OKLAHOMA'S OPPORTUNITY

FORTY-SIXTH State to be admitted; more densely populated, more liberally supplied with railroads, and further advanced in its school system, internal commerce, and improvement of farms, mines, and ranches, than any other commonwealth on its birthday, Oklahoma is well named the "Boomer State." Diversified farming, of recent years so strongly recommended to alleviate distress in the South when cotton fails, or in the middle West when drought shortens the corn or wheat crop, seems here to have been generally adopted. Although mining and lumbering, farming, fruit raising, and stock raising lead, in turn, from East to West, the average Oklahoman, and the farmer in particular, derives his income from many sources. A versatile, prosperous, and apparently foresighted man he is.

No other State has had the chance so early in its history to safeguard, improve, and establish forests—properly harvest and protect the abundant woodland on the hillsides in the east and plant groves on the prairies of the west. No one now doubts that this course is necessary to continued prosperity.

Oklahoma, speaking of the Indian

Territory portion, produced in 1905 2,924,427 tons of coal, worth $5,145,358. But to do so one and three-fourths million feet of round timber and one and a half million board feet of sawed timber were used. The value of this timber at the average price paid, 3½ cents per cubic foot and $15.29 per thousand board feet, was $87,842. This, moreover, was lower than the average price in the twenty-four States in which mine props are extensively used; in fact, in the case of round timber, 2½ cents per foot lower. And it was no doubt lower than the cost of the same amount of timber this year. The present low price is explained when it is remembered that the splendid forests of pine, oak, hickory, and gum in the mountain districts have scarcely been drawn upon. The lumber cut reported in 1905 was 11,667,000 board feet, and the entire value of timber products $558,000. If placed under forest management an equal or greater yield can be obtained indefinitely, but the hills are being stripped of their forests, with no care for the valuable young timber remaining, or thought for future crops; and right now is the opportune time to adopt measures that will prevent such unwise action.

In the western half of the State, now wooded only along the streams, the farmer can secure, in large measure, the comfortable protection provided by nature in eastern Oklahoma. All who have visited that region know how kindly the shelter belt tempers the severity of the wind, and are familiar with its economic value in preventing rapid evaporation of moisture from land planted to crops or orchards. That farmers appreciate the necessity of storing water is evident from the abundance of artificial ponds in the western part of the State, maintained by the annual repair and occasional rebuilding of dams. In many cases, when not too low, the depression used for a pond, and in other cases the adjoin-

Mixed forest of pine and hardwoods characteristic of the southern Ozarks

Native cottonwood trees. The pioneer settlers sought their shelter as a camping place

Thickly planted wind-break of black walnut, a tree admirably suited for planting in eastern Oklahoma.

ing ground, would be a suitable site for a forest plantation, which will give protection as well as wood supplies for the farm.

The three notable catalpa plantations in Reno, Greenwood, and Crawford counties, Kansas, could be reproduced almost anywhere in eastern Oklahoma, and the black walnut nowhere reaches better development. The growth of the elms in the city park at Perry has been so rapid as to receive comment in a New York magazine. The almost phenomenal success which has attended the culture of orchards indicates how admirably soil and climate are in general adapted to trees.

Forestry is not unknown to the people of Oklahoma. Thirty-one planting plans, already put into execution, have been made for applicants by the United States Forest Service. Much knowledge of trees and methods for western Oklahoma is expected from the experience of the Panhandle Forestry Association, with headquarters at Amarillo, Tex., which has planted on a large scale. It is earnestly to be hoped that the people of Oklahoma will see to it that the strong forest sentiment of the State at large is crystallized into definite action. This seems likely in view of the action of Governor Frantz in inviting Mr. Pinchot, the Forester of the United States Department of Agriculture, to address the Constitutional Convention. Mr. Pinchot was unable to attend, but a warm reception was given Mr. George L. Clothier, who was delegated to attend in his stead. In his address, and in personal interviews, Mr. Clothier pointed out the necessity of husbanding forest resources and of preventing a few from monopolizing them. His chief mission, however, was to recommend Constitutional provisions which would insure the validity of forest laws

Black locust, 10 to 24 inches in diameter, 26 years planted

essential to a progressive State forest policy. Four of these recommendations follow:

The General Assembly (or State Legislature) shall enact laws in order to prevent the destruction of and to keep in good preservation the forests upon the lands of the State, or upon the lands of the public domain the control of which shall be conferred by Congress upon the State.

The General Assembly may provide that the increase in value of private lands caused by the planting of hedges, orchards, and forests thereon shall not be taken into account in the assessment thereof.

The General Assembly may provide that forest land held for growth of a future forest crop may be assessed at a much lower rate than agricultural land, and that a heavy rate of taxes may be assessed upon the mature timber as it is being cut, to compensate the State for the loss of income from the land while the crop is growing.

The General Assembly may provide that all lands bearing forests or capable of producing forest growth forfeited for taxes shall be purchased by the State and held forever as forest reserves.

This is a good work well begun. A carefully prepared forest law should promptly be enacted by the legislature. It is the experience of our best governed commonwealths that a State forest office in charge of a specially trained forester is indispensable to the permanent welfare of the State. In cases where errors count not for a season, but for one or more generations, the presence of a person well qualifed to give sound technical advice in forest matters is of the utmost value. The widest field for localized experimentation and for proper encouragement of prospective tree planters here exists. The abandoned Fort Supply Military Reservation of 1,760 acres, equipped with buildings and a water system, could doubtless be secured for State use as was the Fort Hays tract in Kansas.

All possible influence should be exerted toward the preservation of the forest lands of the Choctaw nation, comprising about a million and a half acres lying between the M., K. & T. Railway and the Arkansas line. This might be accomplished through purchase from the Indians; or, by agreement, arrangement could possibly be made for conservative cutting of mature timber under Government regulations, the Indians to receive the proceeds. as in the case of the Uinta Indian Reserve in Utah.

RECENT PUBLICATIONS

The Quarterly Journal of Forestry. Issued by the Royal English Arboricultural Society in co-operation with the Irish Forestry Society.

The first number of this publication has just appeared and is very interesting. Judging from the contents of this issue, and from the fact that it will contain the transactions of the two societies under whose auspices it is published, the new magazine promises to be a professional organ of high order. A magazine like this has been badly needed in England, because the United Kingdom, with less than 4 per cent of forest land and her millions of acres of waste land and moorland, is sorely in need of an awakened public opinion that can inaugurate a policy whereby these areas will be turned to a useful purpose.

Of especial interest to American readers is an article on "The Creosoting of Homegrown Timber." A table compiled by Mr. W. B. Havelock gives the amount of creosote absorbed per cubic foot by fifty-six British grown species of wood. Many of these species are indigenous to this country or are planted extensively, which makes the article interesting to the forester and timber user alike. The table has already been copied in this country, but without the notes on penetration, which explain and amplify it.

In an article entitled "The Best Method of Raising Trees from Seed in the Home Nursery," Mr. William Forbes gives careful and lucid directions on the growing of seedlings. While adapted especially to the English soil and climate, many of his recommendations apply equally well to this country. "Do not expect," he says, "to produce forest trees cheaper in the home nursery than they can be purchased in a sale nursery. The advantages of a home nursery are many, but this is not one of them." In England the cost of transportation does not seem to figure at all. The principal advantages are (1) the plants are grown under the best conditions, including conditions of climate and soil identical

with those into which the plant will be transplanted, and have excellently formed roots and stems; (2) they are ready to move into the forest as required, and can be planted the same day on which they have been lifted from the nursery.

"The secret of success in nursery work," as in so many other things, "is to do it thoroughly well, or leave it severely alone; there must be no half-way measures, and everything must be done at the proper time." A very complete table, which represents a vast fund of experience, gives the best nursery practice with thirty-two species, most of which are now being grown in this country.

Notes on the Influence of Forests on the Storage and Regulation of the Water Supply. By S. Beardley-Wilmot, Indian Forest Service. Forest Bulletin No. 9, August, 1906.

The paper consists of two parts,—Part I, European research into forest influences; Part II, Application of results of European research to Indian conditions.

Part I. European research into forest influences. This part is, in the main, a summary of the physical influences of the forests as set forth by Mr. Huffel, who is an inspector in the French Forest Service and professor of the École National des Eaux et Forêts. Following are the main points brought out:—

1. Influence of the forest on air temperature. The general result arrived at by a series of observations is that the forest climate is more equable, though slightly colder, than that of the open; but these observations do not prove that forests modify, as a whole, the climate of those regions in which they cover large areas.

2. Influence on soil temperature. This subject is important because a high temperature denotes more rapid evaporation. It has been proved that a forest soil is warmer by 2° F. in winter and cooler by 5° to 9° F. in summer. The hotter the aspect the more marked the influence of forest growth in reducing soil temperature.

3. Influence on the humidity of the air. The *relative humidity* of the air is higher in the forest than in the plains, not because forest air contains more vapor, but because its temperature being lower, it is, when holding an equal amount of water, nearer its saturation point. On the other hand, the *absolute humidity* of air inside and outside the forest does not vary appreciably.

4. Influence on atmospheric precipitation. Observations show that the lower temperature of the air in the neighborhood of forests induces an increase in the rainfall. The rainfall increases with the extension of the forest area and thus, speaking generally and not for one locality, it appears certain that, other conditions being equal, it rains more at the center of a forest tract than at its edges, and more at the edges than at some distance therefrom, and that the variation in rainfall is independent of the seasons and of wind direction, but is slightly more marked in wet than in dry years. Taking the rainfall at the center of the forest as 100, 93.9 represents the fall at the edge of, and 76.7 the rainfall outside the forest. As a rule, hail-storms cease when they encounter a forest well stocked with mature trees. The question, however, is not yet finally settled.

5. Influence on springs. To prove that forests directly and permanently affect the volume of springs in their neighborhood, the results of afforestation or denudation over a very large area must be observed and the effects on the springs within that area noted. So far, it has not been possible to make this final test. But it has been proved that forest soil receives more atmospheric moisture than deforested land, the reason for this being that trees condense, from the atmosphere, a very large amount of moisture which flows to the earth and more than compensates for any loss in evaporation from the crown of the trees. Thus though there may be no springs in the immediate neighborhood of the forest, yet forests increase the supply of moisture percolating through the soil and, therefore, also increase the supply of underground water which goes to feed the springs.

6. Influence on the percolation of water in the soil. A. General.—This is the most important influence exercised by forest vegetation. Of the water which reaches the soil, a portion flows directly over the surface and reaches the nearest water-course without absorption. Another portion is returned to the atmosphere by *physical evaporation.* A third portion is partly used by the plants in the formation of vegetable tissue, but the larger percentage is returned to the atmosphere through the foliage as *physiological evaporation.* A fourth portion of the water precipitated on the earth sinks deeply into the soil until it encounters an impermeable stratum where it forms the "water-table," the upper surface of which is spoken of as the "spring level." B. In the Mountains.—In the mountains, the flow of rainwater from the surface of the soil is of paramount importance, for the loss due to this cause is much larger than the sum of the losses from all other causes. The percentage of the rainfall which flows from the surface of the soil depends on the angle of the slope and on the quantity of the rainfall or the rapidity with which the snow melts. The action of the forests on the flow of surface waters may be briefly summarized: (a) The foliage and branches of the trees break the force of the rainfall; (b) falls of rain are more frequent and less violent in forests than in the open, while snow melts more gradually; (c) the free flow of surface water is prevented by the

obstacles opposed by roots, by fallen twigs, and by absorption by mosses, dead leaves, and other surface covering of the soil. Thus it is certain that mountain forests exercise a most beneficial influence on the absorption of the rainfall by the soil. C. In the Plains.—Forests affect the permeability of the soil in three ways: (a) by their root systems, which mechanically separate the soil and permit the percolation of water along the live roots and along the channels left by decaying roots; (b) the forest soil is warmer in winter than that in the open country, so that frosts are often prevented inside a forest, thus permitting percolation; (c) physical evaporation is less in a forest than outside it.

7. Influence on the amount of water withdrawn from the soil. We have no exact data regarding the quantity of water withdrawn from the soil by forests or field crops, but the general opinion prevails that forest vegetation does not lower the "spring level" immediately under it to any appreciable extent.

8. Influence on the regulation of torrents. The following four propositions are accepted throughout Europe: (a) The presence of forest growth hinders the formation of torrents; (b) the removal of forest growth facilitates the formation of torrents; (c) the extension of forests causes the extinction of existing torrents; and (d) the removal of forests redoubles the violence of existing torrents and causes others to appear.

9. Influences on avalanches. Where forest growth is standing or where it can be again induced to grow, danger from avalanches ceases to exist.

10. Influence on moving sands. The sole method of fixing moving sand is by afforesting the area.

Part II. Application of results of European research to Indian conditions.

The rivers of India may be divided into two classes; first, those fed primarily from the glaciers of the Himalayan or trans-Himalayan tracts, and, secondly, those with smaller catchment areas which are more entirely dependent for their flow on atmospheric precipitations.

From the glaciers, where the first class of rivers originates, to the upper limit of tree growth, nothing can be done and little is needed to control the course of the Himalayan rivers; but from this point downward the influence of atmospheric precipitation is felt. With regard to those rivers which rise at lower elevations in the plains, it has been pointed out that the protection from excessive evaporation and suitable porosity of the soil are the main conditions which permit the adequate storage of water, and that forest growth encourages these conditions. Thus the rivers of the plains demand that their catchment areas should be protected.

A summary of the Indian theories on the water conditions in that country is given:

1. Speaking generally, the water supply of India is probably more than sufficient for the requirements, agricultural and industrial, of the country if not allowed to run to waste.

2. The storage and regulation of this supply can be automatically and efficiently carried out by natural laws.

3. Provided that man permits the application of these laws, the distribution of water can be efficiently carried out by him in localities where physical conditions do not prohibit it.

4. If, on the other hand, interference with these laws is permitted, the water supply is liable to become deficient or irregular and its distribution impossible or, at least, difficult.

5. It is necessary, therefore, to aid the forces of nature in this respect and, in cases, to prohibit such action as hinders or diminishes these forces with a view to reaping their full benefit in those localities where this may be possible.

Unfortunately, in India the investigations of past years were designed chiefly to prove that afforestation increased the rainfall of the country. This advantage, though important, is quite insignificant compared with the effects of forests in storing and regulating the present water supply which, if not allowed to run to waste, is probably still, in many places, ample to assure the success of agriculture.

In 1885-86, Mr. Blanford, of the Indian Meteorological Department, showed in his annual report that, in the Central Provinces, prevention of shifting cultivation followed by fire protection has, in ten years, increased the rainfall over the affected area by 6.81 inches as recorded at fourteen stations. It would be rash, however, to assume that this increase in rainfall was directly due to cessation of deforestation. The rainfall in a period of ten years very often fluctuates more than 50 per cent.

Many instances are presented in which the absence, or unsatisfactory condition, of forests, is compared with figures for irrigation and famine; all of these show that where forests are not maintained or do not exist and agriculture is dependent more or less entirely on the flow of the rainfall from the surface of the soil, it is not sufficiently protected to afford an assured livelihood to the inhabitants.

It has often been asserted that one-fifth of the surface of the Indian Empire is covered with forest vegetation, but it must not be inferred that the distribution of forests throughout the country is such as to efficiently control and regulate the water supply in every locality. This is far from being the case. The catchment areas of many Indian rivers are in native States, and thus

outside the direct control of the Government.

Afforestation is not everywhere possible, and even if it were it would not result in the entire prevention of famine and scarcity; but it is thought that there are many localities whose treatment on approved principles would result in the creation of a permanent water supply so that the total area adequately protected against famine and flood might be very largely increased. The author suggests that local commissions be appointed to report on the present condition of catchment areas of rivers and on the measures that are necessary to make more of them efficient for the storage and regulation of the water supply of the country.

An appendix is given, entitled "Some Short Extracts from Proceedings of the American Forest Congress, 1905."

Transactions of the Royal Scottish Arboricultural Society. Vol. XX. Part I. January, 1907.

The present number of this semi-annual publication is replete with interesting articles and timely subjects. A review of the more interesting articles is here given.

Development of a Larch Crop. By A. Murray.

Mr. Murray believes that land under properly managed woods will yield a higher return per acre than it will under grazing, or even, in many cases, under agricultural crops. He bases his opinion on a study of six larch trees growing in a plantation of pure larch about forty-two years of age. The plantation was thinned at the age of twenty-seven, at which time the six trees were carefully measured. Having determined the rate of increment of these trees and the present number of trees growing on two sample acres, and assuming the value of lumber to be 12 cents per cubic foot, he obtains the value of $384.73 per acre, giving a gross return of $9.22 per acre per annum. The adjoining land is let for hill grazing at a rent of about 25 cents per acre. He strongly advises the planting of waste lands.

Forest Policy in the British Empire. Reviewed by J. S. G.

A lengthy review is given of Volume I of Schlich's "Manual of Forestry," a new third edition of which has recently been published under the title of "Forest Policy in the British Empire." Dr. Schlich divides this volume into three parts: Part I—The Utility of Forests; Part II—The State in Relation to Forestry; Part III—Forestry in the British Empire. An appendix to Part III, of especial interest to us, treats of "Forestry in the United States of America."

Training in Silviculture. By R. C. Munro Ferguson, M. P.

Mr. Ferguson recommends the establishment of three forest schools in the United Kingdom, each with its own demonstration forest.

On Preparing Working Plans for British Woodlands. By John Nisbet, D. Oec.

A very interesting paper showing the necessity for such plans and the time required to make them.

Notes on Continental Forestry in 1906. By John Nisbet, D. Oec.

This is a review of French and German publications on forestry.

France—The gross receipts for forests are estimated to be $5,947,000; expenditures, $2,723,500; net revenue, $3,223,500. Nine hundred and seventy-six thousand dollars was spent for maintenance and improvement of woodlands and mountain tracts.

There is a feeling of anxiety over the looming aspect of the timber question and the ensuring of adequate supplies in the future. The forests not placed under regular control are said to be disappearing, especially in the mountains. Reforestation does not keep pace with the damage done. Forestry is one of the questions of the day in France.

Forest planting is, more and more, being resorted to, and the movement is greatly helped by financial aid from the Central Government. Of special interest are the efforts made to afforest the sand dunes. About 87,000 acres required fixation, of which 65,000 acres have been retained in the control of the Forest Department. Some of the planted stands are now seventy-six years of age, and a working plan was drawn up for these forests during 1884 and 1887. Down to 1894 receipts did not equal expenditures, but since 1895 there has been an increasing surplus which, in 1905, amounted to almost $100,000.

The question of colonial forestry is not neglected. The French Government has recently sent a "forest mission" to inquire into the best measures that can be taken to protect existing woodlots and plant other regions.

New enemies of the forest, such as newly-studied injurious insects and fungi, and various other subjects of interest to the forester are discussed.

Germany—The German forestry journals contain, as usual, a wealth of scientific information. The statistics are interesting, and a summary is here given:

There is a total of about 21,500,000 acres of forest in Prussia, practically half of which belongs to the State and various communes, while the other half is in the hands of private owners. There is a marked tendency on the part of the private owners to work their forests with a lower rotation than the State, as that means getting earlier returns on the investment.

In Prussia, where there are about 7,000,000 acres of State forests, the gross income for 1904 was $28,510,000; the gross expenditures were $13,418,000, leaving a net revenue of $15,092,000. In all the Prussian forests only 2,300 acres were seriously injured by fire, while 1,500 acres were only slightly damaged.

Dr. Nisbet also gives short reviews of recent publications on German forestry, especially Prof. Endres' "Handbook of Forest Policy, Legislation and Statistics," and the third edition of Prof. Sorauer's "Handbook of Plant Diseases."

L. M.

DEPARTMENT OF THE INTERIOR, United States Geological Survey, Reclamation Service, Washington, D. C., January 12, 1907. Sealed proposals will be received at the office of the United States Reclamation Service, Crawford, Nebraska, until 2 o'clock p. m., February 27, 1907, for building the Pathfinder Dike, situated about 45 miles southwest of Casper, Wyoming, and involving about 170,000 cubic yards of earth excavation and about 16,000 cubic yards of riprap. Particulars may be obtained at the offices of the U. S. Reclamation Service at Washington, D. C., Crawford, Nebraska, and Casper, Wyoming. E. A. HITCHCOCK, Secretary.

DEPARTMENT OF THE INTERIOR, United States Geological Survey, Reclamation Service, Washington, D. C., January 8, 1907. Sealed proposals will be received at the office of the United States Reclamation Service, Huntley, Montana, until 10 o'clock a. m., March 12, 1907, for the construction of about 185 miles of canals, ranging in capacity from 5 to 1,000 cubic feet per second, involving approximately 900,000 cubic yards of excavation, and doing such other work as may be necessary for the completion of the canals. Particulars may be obtained by application to the U. S. Reclamation Service, Washington, D. C., or to the U. S. Reclamation Service, Cody, Wyoming. E. A. HITCHCOCK, Secretary.

DEPARTMENT OF THE INTERIOR, United States Geological Survey, Reclamation Service, Washington, D. C., January 4, 1907. Sealed proposals will be received at the office of the United States Reclamation Service, Williston, North Dakota, until 10 o'clock a. m., March 5, 1907, for the construction of canals and ditches, involving the excavation of about 420,000 cubic yards of earth, and furnishing labor and material for a pumping station and various structures requiring about 120,000 feet B. M. of lumber, about 1,300 cubic yards of concrete, and 10,000 pounds of structural steel, in connection with the Buford-Trenton project. Plans, specification and proposal blanks may be obtained from the Chief Engineer, United States Reclamation Service, Washington, D. C., or from H. A. Storrs, Electrical Engineer, Williston, North Dakota. E. A. HITCHCOCK, Secy.

DEPARTMENT OF THE INTERIOR, United States Geological Survey, Reclamation Service, Washington, D. C., February 2, 1907. Sealed proposals will be received at office of the United States Reclamation Service, Great Falls, Montana, until 2 o'clock, p. m., March 15, 1907, for constructing an earth fill dam and accessory structures, located on Willow Creek, about five miles northwest of Augusta, Montana, and involving about 7,500 cubic yards of open cut excavation, 170,000 cubic yards of embankment, 620 linear feet of lined outlet tunnel, and 130 cubic yards of reinforced concrete. Particulars may be obtained from the Chief Engineer of the Reclamation Service, Munsey building, Washington, D. C., the Supervising Engineer, Huntley, Montana, or the Engineer, Great Falls, Montana. E. A. HITCHCOCK, Secretary.

DEPARTMENT OF THE INTERIOR, United States Geological Survey, Reclamation Service, Washington, D. C., February 6, 1907. Sealed proposals will be received at the office of the United States Reclamation Service, Great Falls, Montana, until 2 o'clock p. m., April 3, 1907, for the construction of 12 miles of main canal, 67 miles of laterals, and 17 miles of waste water ditches, near Great Falls, Montana, and appurtenant structures, involving approximately 481,000 cubic yards of excavation, 1,200 cubic yards of concrete, 900 cubic yards of paving and riprap, 290,000 feet B. M. of lumber, the placing of 182,000 pounds of steel, and the furnishing of such other material and the performance of such other work as may be necessary for the completion of the work.

Plans, specifications and proposal blanks may be obtained from the United States Reclamation Service, Washington, D. C., or from the United States Reclamation Service, Great Falls, Montana. E. A. HITCHCOCK, Secretary.

DEPARTMENT OF THE INTERIOR, United States Geological Survey, Reclamation Service, Washington, D. C., February 12, 1907. Sealed proposals will be received at the office of the United States Reclamation Service, Portland, Oregon, until 2 o'clock p. m., April 15, 1907, for the excavation of the Keno Canal, near Klamath Falls, Klamath project, Oregon-California, involving about 80,000 cubic yards of earth and rock excavation.

Plans, specifications and forms of proposal may be obtained by application to the Chief Engineer of the United States Reclamation Service, Washington, D. C., the Supervising Engineer, 307 Tilford building, Portland, Oregon, or the Project Engineer, Klamath Falls, Oregon. E. A. HITCHCOCK, Secretary.

SUDWARTH PRINTING COMPANY, WASHINGTON, D. C